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A TREATISE ON

PRESCRIPTION INCOMPATIBILITIES AND DIFFICULTIES

INCLUDING PRESCRIPTION ODDITIES AND CURIOSITIES

FOR PHARMACISTS AND PHYSICIANS AND STUDENTS IN PHARMACY AND MEDICINE

BY

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1919

CRITIC AND GUIDE COMPANY

12 MT. MORRIS PARK WEST

NEW YORK

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TO THE MEMORY
OF
CHARLES RICE

ONE OF THE NOBLEST REPRESENTATIVES OF
PROFESSIONAL PHARMACY
IN THIS COUNTRY
A MODEST AND UNSELFISH MAN OF SCIENCE
I GRATEFULLY AND REVERENTLY
DEDICATE THIS VOLUME

W. J. R.

PREFACE

FRANKNESS demands the statement that the subject of Prescription Incompatibilities is of considerably less importance now than it was twenty or thirty years ago. It was a rare day then when an editor of a pharmaceutical journal or one who was considered an expert in solving incompatible riddles did not receive orally or in writing a despairing call for help from some sorely puzzled druggist, who in attempting to put up a prescription as written by the doctor, got an unsightly, impossible mass, a strange, unlooked-for color, or perhaps a dangerously explosive mixture. And pharmaceutical journals devoted a good deal more space than they do now answering the "incompatible" queries of their subscribers. The flood of new remedies and synthetics was then at its height and the physician still unweaned from his habit of polypharmacal prescribing insisted on joining together things which the spirits of chemistry, pharmacy and therapeutics intended should be kept asunder. The idea at that time was still pretty general that the value of a prescription increased in direct ratio to the number of its ingredients. And the result was—not infrequently—a spoiled, useless, ludicrous, or even dangerous combination.

Things are different now. Our propaganda during the past twenty-five years in favor of simple rational prescriptions has borne fruit. The modern physician does not believe in shotgun prescriptions; he prescribes one, seldom more than two or three active ingredients in a prescription. In fact, the tendency is now towards the other extreme: single remedies is the slogan, the physician thus not infrequently depriving himself of valuable synergistic or corrective combi-

nations. Of course, the fewer the ingredients in a prescription, the fewer the chances for incompatible combinations or impossible absurdities.

Nevertheless, the days of incompatible prescriptions and questionable combinations are not entirely over. Not as often as formerly, but still often enough is the author appealed to to clear up difficult points in physicians' prescriptions, and it is lack of time, and not lack of opportunity, that prevents him from playing the rôle of oracle on incompatibilities to the pharmaceutical profession. No, the subject of incompatibilities has not yet altogether lost its importance. And every intelligent pharmacist as well as every self-respecting and conscientious physician should be on terms of familiarity with the salient facts of prescription writing, so that the latter may avoid and the former correct glaring absurdities.

It is just a quarter of a century since the author began to teach and to write on the subject of this book. His first Treatise on Prescription Incompatibilities and Difficulties appeared in Merck's Report, where it ran for several years. In a revised form it was published in The Critic and Guide for 1903, 1904 and 1905. It is not a mere phrase to state that the Treatise met with *exceptional* favor. It was claimed that the author was the only writer in the field who succeeded in making a dreary and dry-as-dust subject readable and interesting. And being interesting, the subject became *memorizable;* it left an impression on the tablets of one's memory, which a dreary, non-interesting subject rarely does. The requests to reprint the Treatise in a separate volume were quite numerous—but then a busy practice and other, more interesting literary work made compliance with the request a practical impossibility. And with each year that passed the Treatise became more inadequate—because new remedies came into use and with them new incompatibilities, and the composition of certain pharmacopeial galenicals became changed, so that explanations and criticisms which

held good before, held good no longer. To bring the Treatise on Prescription Incompatibilities up to date required considerable additions, a few eliminations and a thorough revision. I despaired of ever having the time to devote to it.

But I recently achieved some leisure and I have taken the opportunity to subject the Treatise to a thorough revision and to bring it up to date. And I now take pleasure in presenting this enlarged and revised Treatise on Prescription Incompatibilities and Difficulties, including Prescription Oddities and Curiosities, to my friends in the pharmaceutical and medical professions.

A word on the kind of prescriptions and incompatibilities that are discussed in this Treatise. They are bona fide prescriptions and combinations, and the incompatibilities are such as have presented themselves to some druggists and physicians and are apt to present themselves again to others. It is not only superfluous and unnecessarily space-consuming, but it is mind-confusing and discouraging to present incompatibilities in prescriptions which never happened and never could happen, because no physician in his wildest flights of fancy would ever think of writing such combinations.

Let me illustrate by some examples: Of what use is it to tell a physician or a pharmacist, or a medical or pharmaceutical student, that mucilage of acacia is precipitated by sodium phosphomolybdate, that acetanilid gives a white precipitate with bromine, that meconic acid gives a precipitate with barium chloride, that urethane give off some ammonia when heated with a solution of potassium or sodium hydroxide, that cadmium salts are precipitated by alkali carbonates and chromates, that gamboge with ammonia water gives a yellow colored solution, that a mixture of cocaine and calomel acquires a dark color if the fumes of hydrochloric acid are blown over it, that a solution of methylthionine hydrochloride is precipitated by potassium bichromate, that piperazine explodes when heated to a certain temperature with sodium hypochlorite, that potassium salts give

a yellow precipitate with platinic chloride and hydrochloric acid, that sugar is decomposed with ignition by concentrated sulphuric acid, that thymol is incompatible with chromic acid, etc., etc.—the list could be extended indefinitely.

It is not merely superfluous, but, as stated above, is confusing and discouraging to the student. For, seeing that most drugs have dozens and some even hundreds of incompatibilities, he loses courage and despairs of ever mastering the subject. Why, many of the chemicals given as incompatibles of this, that and the other thing are not even medicinal preparations, are never used in medicine, are never prescribed and consequently can never form the subject of *prescription* incompatibilities! Who ever heard of a doctor prescribing acacia with sodium phosphomolybdate, acetanilid with bromine (elementary bromine!)? And of what interest is it to a student of incompatibilities to know that meconic acid is incompatible with barium chloride? Have the two ever been prescribed? And has a doctor ever prescribed sugar with concentrated sulphuric acid? Or has anybody ever ordered to blow the fumes of HCl over a mixture of cocaine and calomel? And so on. So what is it all for? The examples I have enumerated are chemical tests and reactions—they are useful in their place, but they *have nothing* to do with the subject of incompatibilities. This book will be found free from the superfluities referred to, and will, it is hoped, be found more acceptable and more useful on that account.

W. J. R.

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INTRODUCTION

THE subject of incompatibilities has always been the *bête noire* of the pharmacist and physician. Whether it is because the subject is really a difficult one, or because it has not received proper and satisfactory treatment in our text-books, in our pharmaceutical and medical journals, or because the educational standard of the pharmacist and physician is not high enough, not broad enough to enable them to master the subject thoroughly, certain it is that the number of pharmacists and physicians who are able to grapple successfully with all the intricacies of prescription incompatibilities is a very limited one. It shall be the purpose of this treatise to solve the many mysteries of incompatibilities. It is the author's conviction, based upon an experience of many years, that there is no subject, no matter how apparently intricate and complicated, that cannot be mastered by a person of average intelligence, provided it be presented in the proper light and in a proper manner; that there is no subject, no matter how dry, that cannot be made interesting and attractive.

The author's opportunities for seeing and analyzing incompatible prescriptions have always been exceptionally favorable ones. Besides the large collections he has made in his quondam drug-store practice, he is constantly receiving inquiries from pharmacists in various parts of the city and country, regarding some mooted points. He is also frequently honored with letters from physicians, who, on getting untoward effects from some combinations, ask for enlightenment. They frequently inquire whether it is the fault of the combinations, or whether the druggist had perhaps sub-

stituted something else for what had been prescribed. Finally, the author had been for a number of years regular "consultant" to a number of pharmaceutical journals and in this capacity he has had to analyze and explain incompatible prescriptions almost daily.

As to why I consider the subject of prescription incompatibilities of such paramount importance to the pharmacist, I can do no better than to quote from a paper of mine on the subject, read at the Twenty-second Annual Convention of the New York State Pharmaceutical Association. I started that paper by stating that the business of the retail pharmacist of the present day consisted of three branches: that of manufacturing galenical preparations, that of selling patent medicines, druggists' sundries, etc., and that of dispensing physicians' prescriptions.

The first two departments have been encroached upon to a very great extent. The large manufacturing houses with limitless facilities, improved machinery, immense capital and modern methods have been able to offer certain classes of preparations to the retail druggist at such a price as to take away from him every incentive to do his own manufacturing. And there is no help for that. No matter how we may deplore the fact that the druggist of the present day is unable to spread a plaster or roll a pill so dexterously as did the apothecary of a generation or two ago, you cannot change the tendency of the times. For the sake of sentiment no druggist will spend several hours in making a preparation, which he can purchase ready made and as well made at a lower price.

The sale of patent medicines, etc., is being every day more and more monopolized by the department stores. This is also inevitable, as will be admitted by any one who has given the subject some thought and who can read the signs of the times.

But there is one department which is still the pharmacist's own—a department which distinguishes him as a profes-

sional man and elevates him above the ordinary merchant. I refer to the prescription department. That is a department which nobody can take away from the pharmacist; because, while no law can be passed to prevent people from selling ordinary drugs and patent medicines, the dispensing of prescriptions can be limited to qualified pharmacists only. And to the development of this department the pharmacist should devote his best energies. To do this successfully he must become a *master prescriptionist* and be familiar with all the intricacies of prescription incompatibilities. Nothing will more securely hold your physician's patronage than his confidence in your ability as a prescriptionist, in your ability to dispose of difficulties and to prevent untoward results.

It has always been a source of wonder to me why the subject of incompatibilities has been so sadly neglected in our college curricula. The student is taught the various steps of preparing sulphuric acid, or of the preparation of soda by the Leblanc process (things of which he will never make any practical application), but he is left in ignorance as to how to mix Fowler's solution and Magendie's solution without precipitation. He is taught the difference between cast and wrought iron, but he is left in ignorance as to why a precipitate occurs on the addition of potassium iodide to syrup of ferrous iodide and how to prevent it.

To me the subject of prescription incompatibilities has always seemed of paramount importance. It is practically more useful than botany, more useful than pharmacognosy, and even more useful than manufacturing chemistry—and I hope the time is not far distant when it will occupy the *first rank* in the curriculum of every school of pharmacy in the United States.

THE MEANING OF "INCOMPATIBLE"

The word "incompatible," according to the definition of the various dictionaries, means incapable of existing together in agreement or harmony. We call a prescription incompati-

ble when its ingredients are of such a nature that, if brought together, one or more of the following changes would take place: (1) Mutual decomposition of the ingredients, with the formation of a new compound; (2) precipitation, chemical or physical; (3) explosion; (4) deflagration; (5) liquefaction, when the ingredients are prescribed in powders; (6) the deterioration or destruction of one or more of the ingredients.

But it would be a mistake to suppose that the word incompatible is synonymous with "non-dispensable." On the contrary, as will be seen later, there are many combinations which, broadly speaking, are incompatible, but not only may they be dispensed without any hesitation, the incompatibility is intentional and distinctly desirable.

Incompatibilities are generally divided into three classes: (1) Chemical incompatibility, where the change is the result of a true chemical reaction, e. g., when sodium salicylate is prescribed with diluted sulphuric acid, salicylic acid precipitates out, and sodium sulphate is in solution; (2) pharmaceutical, when the change is the result of a physical condition, i. e., when the menstruum is unsuitable, e. g., when fluid extract of cannabis indica is added to water and the resin is thrown out of solution; and (3) therapeutic, where the drugs prescribed have antagonistic medicinal properties (as when chloral and strychnine are prescribed together, or digitalis and aconite). With the latter variety, therapeutic incompatibility, the pharmacist has absolutely nothing to do, nor is he to permit himself to make any suggestions to the physician in that direction. The pharmacist is not competent to judge of what constitutes therapeutic incompatibility; it is none of his affair; two drugs may be antagonistic in one respect and synergistic in another, and it is for the latter effect that the physician prescribes them.

The author's classification of incompatibilities, which he introduced several years ago and which has been found both useful and practical, is as follows:

(1) Permissible and desirable incompatibility, when the

resulting change is of no significance, or where the new compound is expressly desired by the physician.

(2) Preventable incompatibility, where the incompatibility can easily be prevented, either by a change in the order of mixing the ingredients, or by the addition of acid, etc., and

(3) Absolute, or true, incompatibility, where the prescription cannot possibly be dispensed in its original form and where one or more ingredients must be left out altogether or other ingredients substituted. It is this last kind of incompatibility which is practically synonymous with nondispensability. This classification I have found especially useful for students.

PRESCRIPTIONS

TO master the subject of incompatibilities, each prescription should be read carefully. It is not necessary to attempt to memorize all incompatibilities; but it is important to try to understand the general principles. At the end of the volume, the incompatibilities will be summarized and classified alphabetically, so that they can be easily referred to.

1. Morphinae Sulphatis ..... gr. iv
   Ac. Tannici ..... gr. viii
   Aquae Destillatae ..... ℥ ij
   Inject with ear syringe.

I start this series of incompatible, difficult and odd prescriptions with the above, because it is so very common. With all that has been written on prescription incompatibilities one would think that such a combination would not present any difficulty to any pharmacist. But such, it appears, is not the case. The druggist seemed to be very much surprised and indignant at the fact that a "precipitate formed when he added the tannic acid to the solution of morphine, which did not dissolve on long shaking." Well, a precipitate does form when tannic acid is added to morphine, and not only to morphine, but to all other alkaloids. This is one of the commonest kind of incompatibility that we encounter in the drug store practice.

ALKALOIDS ARE INCOMPATIBLE WITH TANNIC ACID OR WITH SUBSTANCES CONTAINING TANNIN.

The alkaloid is precipitated out of its solution as a tannate.

In the above prescription we see a good example of true

incompatibility. The physician apparently prescribed the tannic acid as an astringent to stop a discharge in the ear; the canal of the ear being painful, he also prescribed morphine sulphate with the intention of diminishing the pain, but this latter object is completely defeated, because the morphine sulphate is converted into the insoluble morphine tannate, which being insoluble cannot be absorbed and cannot act. Even the astringent action of the tannic acid is diminished, because a part of the latter is precipitated and is in combination with the morphine.

2. Morphinae Sulphatis ..... gr. iv
   Ammonii Carbonatis ..... ʒ jss
   Syr. Senegae ..... ʒ ss
   Aquae .....q.s. ad ʒ iij

S. Teaspoonful 4 times a day, as directed.

A very common prescription, but incompatible nevertheless. The morphine is precipitated in the alkaloidal form by the ammonium carbonate which is a strong alkali. Of course putting a shake label on the bottle diminishes the danger to a great extent, but it does not entirely eliminate it. As a general rule mixtures with poisonous precipitates or sediments should not be dispensed.

In the above prescription, the syrup of senega alone would have a tendency to precipitate the morphine because it contains some water of ammonia.

Alkaloids Are Precipitated by, and Therefore Incompatible with, Alkaline Hydroxides, Their Carbonates and Bicarbonates and with Salts Having an Alkaline Reaction.

Such are: potassium hydroxide, carbonate and bicarbonate; sodium hydroxide, carbonate and bicarbonate; ammonium hydroxide (= ammonia water) and carbonate; calcium hydroxide (= lime water); sodium borate and sodium phosphate, the latter salts having an alkaline reaction. Magnesium hydroxide, $Mg(OH)_2$, has the same tendency, but its solubility is very slight and it is seldom prescribed in combination with alkaloids.

3. Morphinae Sulphatis ..... gr. ij
Antimon. et Potass. Tartratis..... gr. ij
Ammon. Chloridi ..... ʒ j
Syr. Pruni Virgin. ..... ʒ ij

Tannic acid is an excellent precipitant of tartar emetic (the precipitate formed is antimony tannate), and wild cherry contains a large amount of tannic acid. The morphine will also be precipitated, as morphine tannate. It is true that no reports of bad results have ever reached me—probably because the precipitates are so well suspended in the thick syrup. Nevertheless, the combination is not a good one. If it is dispensed, a "shake" label should invariably accompany it.

Tannic Acid Precipitates and Is Therefore Incompatible with Tartar Emetic (Antimony and Potassium Tartrate).

4. Fluidextr. Cannabis Indic. ..... ʒ ij
Kali Bromati ..... ʒ vj
Aquae Menthae Pip. ..... ʒ iij

The resins contained in the cannabis indica precipitate when added to water. The finely divided precipitate gradually collects in little lumps. A nice homogeneous mixture can be made by rubbing the fluidextract with one or two drams of acacia, and then gradually adding some water so as to form an emulsion. The mixture will also have a much less disagreeable taste; so that both from a pharmaceutical and a gustatory point of view the employment of acacia is not only justifiable, but clearly indicated. This is a typical example of pharmaceutical incompatibility.

Resinous Fluidextracts and Tinctures Precipitate When Mixed with Water.

5. Hydrogenii Peroxidi
Aquae Calcis .....āā 60.0
S. Use for throat in atomizer.

On mixing the two solutions a whitish precipitate is no-

ticed. This precipitate is generally considered to consist of calcium sulphate or calcium phosphate, the formation of those precipitates being due to the sulphuric or phosphoric acid contained, in small amounts, in the peroxide of hydrogen. This explanation is true as far as it goes, but it does not go far enough. The precipitate also occurs in varieties of peroxide of hydrogen which contain no sulphuric or phosphoric acid, but only hydrochloric acid. It certainly cannot be due to the latter, because calcium chloride is a very soluble salt. No, the chief precipitate is due to the formation of calcium peroxide, which is a white crystalline compound. The equation is a simple one:

$$Ca(OH)_2 + H_2O_2 = CaO_2 + 2H_2O.$$

The question under discussion is not one of theoretical interest only; it is of great practical importance. If the precipitation were due to the formation of calcium sulphate or phosphate only, no objections could be raised to the prescription. In fact, except for the precipitate clogging the holes in the atomizer, the addition of lime water to peroxide of hydrogen might be considered an advantage, because the acidity of the latter becomes neutralized and the sharp burning taste is lost. But having learned that the peroxide becomes decomposed, we see that the combination is an inadmissible one.

It Is Best Not to Prescribe Lime Water and Peroxide of Hydrogen in the Same Mixture.

I might add that calcium peroxide is a commercial product, being sold under various names as a gastrointestinal antiseptic.

6. Protargol ..... gr. ij
   Zinci Sulphatis ..... gr. iij
   Aquae Destillatae ..... 3 iv
   M.f. Collyrium.

This prescription is absolutely incompatible. On adding the zinc sulphate to the protargol solution the latter becomes

completely decolorized, while at the same time a rather abundant precipitate takes place. (The precipitate is soluble in ammonia water.) To dispense it with the precipitate is of course inadmissible, the prescription being intended for an eye wash, or eye drops. The druggist who received this prescription, dispensed it after filtering out the precipitate. A very poor way. It is much better to leave out the sulphate of zinc and notify the physician.

PROTARGOL IS ABSOLUTELY INCOMPATIBLE WITH ZINC SULPHATE.

7. Tr. Ferri Chloridi ..... ℥ ss
Syr. Simplicis ..... ℥ j
Aquae Cinnamomi .....q.s. ad ℥ iv

It does not seem as if anything could be the matter with this innocent prescription, but there is. The cinnamic aldehyde present in the oil of cinnamon (from which the water is prepared) reacts with the ferric chloride; the solution, at first clear, becomes after a short time turbid and dirty-looking, and a slight deposit forms. It is best to substitute another water for the cinnamon water, with the physician's knowledge, of course, but if the prescription must be dispensed as written, the patient should invariably be informed of the change in the appearance which the medicine will undergo in a few hours. Otherwise he will be almost sure to bring it back the next day, with the question if a mistake had not been made, or if the medicine did not get spoiled. If the patient is prepared for such a thing he will never make any fuss about it; on the contrary, his respect for the druggist's knowledge and predicting powers will be greatly increased.

8. Tr. Ferri Chloridi ..... 3 ij
Spir. Pimentae ..... 3 j
Syrupi Sacchari ..... ℥ j
Aquae .....q.s. ad ℥ iij

The Eugenol present in the oil of pimenta reacts with the ferric chloride, producing a turbidity in the mixture, with the

final deposition of a dark-brown precipitate. The same reaction takes place if Aqua Pimentae is used instead of the spirit. The remarks concerning the preceding prescription apply also to this one.

9. Acidi Tannici ..... ℥ j
   Aquae Calcis ..... ℥ iv
   S. Use as a gargle.

Tannic acid is incompatible with lime water. When the two are mixed, a bulky, bluish-white precipitate results. The precipitate is a tannate of calcium, though its composition is somewhat variable. The prescription should hardly be dispensed.

Lime Water and Other Soluble Calcium Salts Are Incompatible with Tannic Acid.

10. Glyceriti Ac. Tannici ..... ℥ ij
    Aquae Calcis ..... ℥ vj
    S. Use as a gargle.

The same reaction takes place here, only the precipitate is of a whitish color and is, on account of the glycerin, more evenly distributed. This prescription may be dispensed, but it is best, perhaps, to call the physician's attention to the incompatibility.

11. Atrop. Sulphatis ..... gr. v
    Ext. Colchici Sem. Fl. ..... ℥ ij
    Potassii Iodidi ..... gr. x
    Sodii Salicyl ..... gr. xx
    Tr. Guaiaci ..... ℥ ss
    Aquae Foeniculi .....q.s. ad ℥ ij
    S. 3 i every four hours.

I present this prescription not so much for its incompatible points as for its peculiar dosage. When the doctor was told that the dose of atropine—1/3 of a grain—was a lethal one, he answered irascibly that he did not wish to be bothered in the future; that we knew he was not well up in doses, and that therefore we could fix the doses to suit ourselves! He

afterwards gave us carte blanche so far as his prescriptions were concerned; we could change the dosage, leave out ingredients (incompatible ones), etc. Very often he only wrote the ingredients, leaving it to us to fix the quantities. He has a very large practice, nevertheless!

The incompatibilities are: the KI with the atropine (and perhaps with the colchicine), and the tincture of guaiac with the water (the resin precipitates at once). The tincture sometimes strikes a blue color with acacia, but the latter may be used to make an emulsion, in spite of this.

12. Argenti Nitrici ..... gr. xv
Aquae Destillat ..... ℥ i
Detur in vitro nigro et signa: Pro usu externo.

This is a perfectly innocent and compatible prescription, but the making up of it afforded a good deal of amusement; the senior, the junior, and even the boy joined in the resulting merriment. The incident related here took place in the old land-mark pharmacy, at the corner of Houston and Clinton streets, this city, H. L. Metz and then Nicholas Tauszig, proprietors. It was on a Sunday, the boss was out, and business was exceedingly rushing. One hundred and fifty to two hundred prescriptions a day was the general average, but that day the number was much greater. There were besides quite a few "hard" prescriptions, such as 500 silver-coated creosote pills, 120 suppositories, 500 cachets, etc. A sign was therefore put out: "Relief clerk wanted." Soon a young man presented himself, who said he had worked in a drug-store on the other side, but could find no position here and would be glad to relieve for $2.00 an afternoon. The first two prescriptions he made up all right. The third prescription was the above. He went to the poison closet, where we used to keep all potent drugs, found the bottle with the label Argentum nitricum, weighed out the alleged silver nitrate, put it in a bottle, added the water, and started shaking it; after shaking violently for two or three minutes, finding

that the "silver nitrate" would not dissolve, he emptied the contents into a mortar, and started to pound the "silver nitrate." This, of course, caused surprise to his fellow-prescriptionists, and on looking into the mortar it was found that the alleged silver nitrate was—*flaxseed!* As you perhaps know, fused silver nitrate formerly used to come in bottles filled with flaxseed. This was done to prevent the sticks from breaking. He was unfamiliar with the fact and thought, so he said, that the flaxseed was a special form in which silver nitrate came in this country. But we suspected that he had never handled silver nitrate before.

13. Magnes. Calcin. ..... ʒ iij
Pulv. Rhei ..... ʒ ij
Pulv. Zingiberis ..... ʒ j
Sodii Bicarbon. ..... ʒ j
Olei Menthae Pip. ..... gtt. v
Aquae ..... ad ℥ iv

After standing for a while this mixture thickens and solidifies to such an extent that it is impossible to either shake it or pour it from the bottle. The cause of it is to be found exclusively in the tendency of magnesium oxide to combine with water, forming a gelatinous hydrate: $MgO + H_2O \rightleftharpoons Mg(OH)_2$. If the heavy calcined magnesia—magnesii oxidum ponderosum—be used instead of the light magnesia, the tendency to gelatinization will be greatly obviated. Sometimes even when the light magnesia is used, no gelatinization takes place. This is due to the sad fact that in some drug-stores magnesia is handled so carelessly (left in open vessels, in a moist atmosphere, etc.), that in a short time the magnesia is no longer magnesia, but magnesium carbonate (that is, hydrocarbonate), and this latter does not gelatinize with water. I have seen many such samples of "magnesia."

14. Spir. Ammon. Armat. ..... ʒ ij
Spir. Menth. Piper. ..... ʒ j
Aquae Calcis ..... ℥ vj
S.: ℥ ss after meals.

A slight precipitate of calcium carbonate will be formed, due to the ammonium carbonate in the aromatic spirit. The oils of both spirits will be precipitated by the lime water, making a milky mixture; an inelegant combination but one that may be dispensed with a "shake" label.

15. Acidi Carbol. ..... gtt. xx
Natrii Bibor. ..... ℥ ij
Natrii Bicarb. ..... ℥ ij
Glycerini ..... ℥ j
Aquae .....ad ℥ viij
S.: Use with nasal douche.

This is practically the well-known Dobell's solution, only modified in the proportions of the ingredients. An effervescence takes place, due to the evolution of carbon dioxide. What is this evolution due to? "To the action of the carbolic acid on the sodium bicarbonate," many would answer. No; it is caused by the action of the boric acid on the sodium bicarbonate; the boric acid being formed by the action of the glycerin on the borax. A full discussion of this subject will be found in another prescription.

16. Potassii Iodidi ..... ℥ v
Tr. Ferri Chloridi ..... ℥ iij
Aquae .....ad ℥ iv
S.: ℥ j t.i.d. p.c.

It is not advisable to dispense this prescription, as a considerable amount of iodine is liberated; not only by the free hydrochloric acid present in the tincture, but by the ferric chloride itself, thus:

$$2KI + Fe_2Cl_6 = 2FeCl_2 + 2KCl + I_2$$

It Is Best Not to Prescribe Tincture of Ferric Chloride with Potassium Iodide.

17. Potass. Brom.
Sodii Brom. .....āā ℥ ij
Aquae Camphorae ..... ℥ iv

While camphor is soluble to a very slight extent in water, it is almost absolutely insoluble in solutions of salts. In this prescription it is therefore precipitated out, floating on the top of the liquid or adhering to the bottle as a fine scum.

SALTS SHOULD NOT BE PRESCRIBED TO BE DISSOLVED IN CAMPHOR WATER, PARTICULARLY IN CONCENTRATED SOLUTIONS.

18. Quinin. Bisulph ..... ℥ i
Amm. Carbon. ..... ℥ i
Syr. Simpl. ..... ℥ i
Aquae Cinnam. ..... ℥ ij
S.: ℥ i doses.

Attention has been called to this incompatible prescription times without number, nevertheless it seems to be a favorite with many physicians. Why physicians will prescribe the most soluble quinine salt and then precipitate it is beyond comprehension. There is only one explanation for it: the physician is not aware that a precipitation takes place. The quinine bisulphate, being seventy times more soluble than the sulphate, dissolves easily in the prescribed quantity of water; but the ammonium carbonate (like all alkaline carbonates) causes a precipitate of alkaloidal quinine.

ALKALOIDAL SALTS ARE THROWN OUT OF SOLUTION BY ALKALINE HYDROXIDES AND CARBONATES.

19. Hydrarg. Bichlor. ..... gr. vj
Syrup Hypophosphit. ..... ℥ ij
Syr. Sarsap. Co. ..... ℥ j
Aquae Menthae Pip. ..... ℥ j
S.: ℥ j 4 times a day.

This prescription is absolutely incompatible. The hypophosphites are strong reducing agents, and the corrosive sublimate is entirely reduced: first to calomel and then to metallic mercury. Either the corrosive sublimate or the hypophosphites must be omitted.

CORROSIVE SUBLIMATE AND HYPOPHOSPHITES ARE ABSOLUTELY INCOMPATIBLE.

20. Argenti Nitratis ..... gr. iv
Syr. Hypophosphit ..... ℥ j
Aquae Dest. .....q.s. ad · ℥ iv
S.: ℥ j after meals.

This prescription, too, is absolutely incompatible. The hypophosphites reduce the silver nitrate to black metallic silver. The organic constituents of the syrup also help along the decomposition. There is no way of dispensing the above, except by leaving out either the first or second ingredient. The method of administering silver nitrate in solution is irrational. On coming in contact with the saliva and the secretion from the esophagus, the nitrate becomes almost entirely decomposed. If an effect on the bowels or a systemic effect is desired, the best method is to administer the remedy in the form of enteric pills; i. e., pills coated with salol or keratin.

21. Cocain. Hydrochlor. ..... gr. xx
Atropin. Sulph. ..... gr. ijss
Aconitin. Nitr. ..... gr. j
Collodion ..... ℥ iv
S.: Paint over painful spots when pain is acute.

As cocaine hydrochloride is practically insoluble in ether, and as collodion consists of gun-cotton dissolved in a mixture of 3 volumes of ether and 1 of alcohol, the alkaloidal salt will not dissolve. One of two things may be done: Either dissolve the cocaine and other alkaloidal salts in a little alcohol (it would require about 1½ dr.), and mix the solution with the collodion; or employ alkaloidal cocaine, which is very soluble in ether. The latter course is preferable. The two last alkaloidal preparations need not be changed, as they are in such small quantity that the alcohol present in the collodion will dissolve them without much difficulty.

22. Sol. Magendie
Sol. Fowleri .....āā 8.0
S.: Gtt. viii t.i.d. p. c.

Well do I remember this prescription, as it was the first incompatible one I ever saw. It was almost at the very com-

mencement of my pharmaceutical career. The proprietor mixed the two solutions, affixed the label, but, on delivering it, noticed a precipitate throughout the entire bottle. He seemed to be surprised, and went again behind the counter, mixed the solutions in different order, but with the same result. After two or three more unsuccessful attempts, I was sent to the doctor. "Oh, well, if they don't go well together, leave out the morphine," said the doctor. Thus, ignorance deprived the patient of the ingredient which he was probably in need of. Alkaloids, as we already know, are precipitated by alkalies, their hydroxides, carbonates, and bicarbonates; Fowler's solution contains free potassium carbonate (potassium bicarbonate is used, but on being boiled becomes converted into carbonate); the pure alkaloid morphine precipitates. A few drops of diluted HCl added to the arsenic solution, before it is mixed with the morphine solution, will prevent precipitation, because it will neutralize the potassium carbonate.

23.	Antipyrini	gr. xxx
	Syr. Ipecac.	℥ iiss
	Syr. Prun. Virgin.	℥ ss
	Aquae ad	℥ ii

S.: 3 i 4 x a day.

A flocculent precipitate is formed, due to the tannic acid of the wild cherry combining with the antipyrine. The latter is a synthetic base, behaving in most respects as the alkaloids do, which, as we saw before, are precipitated by tannic acid. Though the mixture might be dispensed with a "shake" label, it is better to call the physician's attention to the fact, so that he may in the future substitute another syrup for that of wild cherry.

24.	Antipyrini	gr. xl
	Spir. Aetheris Nitr.	℥ ss
	Spir. Frumenti	℥ ss
	Syr. Tolutani	℥ i

S.: ℥ i q. 2 h.

This prescription should not be dispensed under any consideration. So it was taught formerly, but we are not so strict now on this point. Antipyrine with sweet spirit of niter forms a grass-green solution which is claimed to be poisonous. The exact nature of the compound formed has not as yet been established. The poisonousness of that compound has also been disputed, and is in fact denied altogether, but it is best to be on the safe side, and not dispense the combination.

ANTIPYRIN SHOULD NOT BE DISPENSED WITH SPIRIT OF NITROUS ETHER.

25. Antipyrini ..... 3 ij
Sodii Salicyl. ..... 3 iv
Div. in Pulv. No. xij.

Antipyrine and sodium salicylate should not be prescribed in powder form, as liquefaction often occurs, especially in damp weather. I have seen this prescription dispensed, and when the box reached the patient, there were only a few thoroughly soaked papers in it; the patient had to send for other powders. I reported a case in the *New York Medical Journal* where the prescribing of just those powders had rather disagreeable consequences for the physician.

ANTIPYRIN AND SODIUM SALICYLATE SHOULD NOT BE PRESCRIBED TOGETHER IN POWDER FORM.

26. Potass. Iodidi ..... 3 ij
Spir. Aetheris Nitr. ..... ℥ iss
Syrupi ..... ℥ i
Aquae .....ad ℥ iv
S.: 3 i q. 2 h.

Potassium iodide and nitrous ether should never be prescribed together, because iodine is set free by the acids usually present in the nitrous ether. No matter how fresh the spirit of nitrous ether may be, the liberation of iodine and discoloration of the mixture are sure to take place within a very short time. Neutralizing the spirit with potassium bicarbonate will

not remedy the evil. I experimented in that line, but never succeeded in making a permanent mixture from those two ingredients. The question in a recent Board of Pharmacy examination: "What happens in a mixture containing potassium iodide and a decomposed sample of spirit of nitrous ether?" is therefore misleading, as there is no line of demarcation between a decomposed and a non-decomposed sample of sweet spirit of niter.

Potassium Iodide, as Well as Other Iodides, Is Incompatible with Spirit of Nitrous Ether.

27. Hydrarg. Oxidi Flavi ..... gr. v
Cocainae Hydrochlor. ..... gr. iv
Ungt. Aq. Rosae. ..... ℥ ss
S.: Eye salve. Apply at night.

The physician prescribes here the cocaine with the intention of diminishing any pain or burning which the oxide of mercury may produce on the inflamed lids and conjunctivae. The result obtained is just the reverse of the expected one. The salve has proved exceedingly irritating to the eyes. The cause of this is the formation of some mercurous and mercuric oxychloride. The physician's attention should be called to this fact, and if he insists on having cocaine, the pure alkaloid should be substituted for the hydrochloride.

28. Cocainae Hydrochlor. ..... gr. v
Sod. Biboratis ..... gr. x
Aq. Destillatae ..... ℥ i
M.F. Collyrium.

The sodium borate, which has an alkaline reaction, precipitates the cocaine in alkaloidal form. The proper way to do is to substitute an equal quantity of boric acid for the borax, or we may add a little glycerin. The latter decomposes the borax, yielding sodium metaborate and boric acid, and the solution being no longer alkaline, no precipitation will take place. The action of glycerin on borax will be fully discussed in another prescription.

29. Quin. Sulphatis ..... ℥ iss
Acidi Sulph. Dil. ..... ℥ ii
Sodii Salicyl. ..... ℥ ss
Syrupi ..... ℥ i
Aquae .....ad ℥ iv

I once watched a junior compound this prescription. He put the quinine in a mortar, added some water, and then the dilute sulphuric acid; to this clear solution he added the sodium salicylate, and lo! a thick mass resulted. He began to triturate vigorously with the pestle, but the more he triturated the more solid and pasty the mass became. He then began nervously to add some more sulphuric acid, thinking thereby to dissolve the mass; but the more acid he added, the worse the matter seemed to become. The entire contents of the mortar had to be thrown away. If made up in a bottle, both the contents and the bottle have to be thrown away, as the bottle cannot even be cleaned, so sticky is the mass. The sulphuric acid here does double mischief; first, it dissolves the quinine sulphate, thus permitting it to fully react with some of the sodium salicylate, forming insoluble quinine salicylate; secondly, it decomposes the rest of the sodium salicylate, forming sodium sulphate and salicylic acid, the latter of which precipitates. In order to be able to dispense this prescription in a more or less presentable form, the sulphuric acid must be left out. The quinine sulphate is rubbed up with about half of the water, the sodium salicylate is dissolved in the other half and mixed with the syrup, and this solution is gradually added to the quinine mixture with agitation. The whole is dispensed with a "shake" label. In this way practically no reaction takes place, the quinine sulphate being kept in suspension instead of being dissolved.

Soluble Quinine Salts Are Incompatible with Soluble Salicylates, the Insoluble Quinine Salicylate Being Formed.

30. Quin. Sulphatis ..... 3 i
Acidi Sulph. Dil. ..... 3 ii
Sodii Acetatis ..... ℥ ss
Syr. Rubi Idaei ..... ℥ i
Aquae .....ad ℥ viij

What has been said in explanation of the previous prescription applies with equal force to this one. The bulky quinine acetate precipitates, and the balance of the sodium acetate is decomposed by the sulphuric acid, with the formation of sodium sulphate and acetic acid. The prescription is to be compounded like the previous one, i. e., the sulphuric acid must be omitted.

Soluble Quinine Salts Are Incompatible with Soluble Acetates.

31. Hydrarg. Chlorat. V.h.par..... 8 0
S.: For doctor's use.

Late one evening, when about to retire, a messenger came with a note from a druggist, requesting an explanation of the above "mysterious" prescription. There is nothing mysterious about it. It means *Hydrargyrum Chloratum via Humida paratum*, that is, calomel prepared by the wet process, or by precipitation. The ordinary calomel is, as we know, prepared by sublimation (*vapore partum*). The calomel prepared by the wet process is in a much finer amorphous condition, and is, therefore, preferred by some physicians; for insufflating into the eyes, for instance, it *is* superior to the ordinary variety.

32. Aqua fontana ..... 100 grms
Illa repetita ..... 45 "
Eadem destillata ..... 12 "
Hydrogenii protoxidi ..... 0.5"
Nil aliud ..... gtt vi!
Sig. One drop in a teaspoonful of water thrice daily.

All physicians know what a placebo is, but many druggists do not. It is a harmless or inert remedy which we are some-

times obliged to give to nervous patients, whom we feel need no medicine, but who think they must take something; bread pills, colored water, etc., are placebos; the word placebo means in Latin: I will please. The above placebo is reported to have cured a large number of neurotic and cranky women of their imaginary ills. It was prescribed for one court lady by Napoleon III's physician and was greatly in vogue with the *grandes dames de la cour.*

As a few of my readers (very, very few, of course!) may not be strong in Latin, I will translate the ingredients into English: (1) Spring water, (2) the same repeated, (3) the same distilled, (4) hydrogen protoxide (i. e., water); (5) nothing else.

Had the demon of curiosity not taken possession of the grande dame, she might have gone on to her last day praising and presenting to her friends the great prescription of the famous Dr. N. But she could not resist the temptation. She wanted to know what the wonderful ingredients were. She presented the prescription to numerous physicians and pharmacists, but they evaded a direct answer or said that those were rare medicaments the nature of which she would not understand. At last she found a druggist, who for a considerable sum of money revealed the fatal secret. The wrath of the grand lady against the physician can be better imagined than described.

33. Tr. Ferri Chlor. ..... ℥ ij
Sod. Salicyl. ..... ℥ iv
Glycerini ..... ℥ i
Aquae ..... ad ℥ iij
S.: ℥ i t.i.d. p.c.

The salicylates are incompatible with ferric salts, forming ferric salicylate, of a deep violet-blue color. This prescription may be dispensed but it is better to inform the physician of the resulting reaction.

Ferric Salts Are Incompatible with Salicylates: a Deep Violet Blue Color Results.

34. Quin. Sulph. ..... ℥ i
Ac. Sulphurici Dil. ..... q.s.
Tr. Ferri. Chlor. ..... ℥ ij
Glycerini ..... ℥ i
Aquae ..... ad ℥ iij
S.: ℥ i t.i.d. p.c.

As the physician has here evidently prescribed the diluted sulphuric acid merely as a solvent for the quinine, it is best left out, as tincture of ferric chloride (on account of its containing free HCl) is an excellent solvent for quinine salts in general.

35. Morphin. Sulph. ..... gr. j
Camphorae ..... gr. xx
Mentholis ..... gr. xv
Pulv. Althaeae ..... gr. xl
Div. in pulv. No. x.

Menthol and camphor, when rubbed together or when long in contact, become liquefied. There is a way, however, of obviating the difficulty: to rub the camphor with a portion of the althea, the menthol with the remainder; then to divide the camphor and menthol separately into ten powders (one kind is wrapped outside with blue paper). The patient is directed to take one of each kind of powder at a time. I do not particularly recommend this method, though I can see no special objection to it.

Menthol and Camphor Liquefy and Are Therefore Incompatible When Prescribed in Powder Form.

36. Morphin. Sulph. ..... gr. ij
Spir. Ammon. Aromat. ..... ℥ ij
Aq. Menth. Piper ..... ℥ vj
S.: ℥ j when required.

This prescription is a dangerous one to dispense. The ammonia will precipitate the morphine. As I said before, poisonous principles should never be dispensed in a state of suspension. In pouring out the medicine, a dose equivalent

to one-third, one-half, or even a whole grain, may easily get into the spoon.

ALKALOIDS ARE INCOMPATIBLE WITH ALKALIES.

37. Antipyrini ..... gr. viij
Calomelanos ..... gr. v
Sacch. Lactis. ..... gr. v

Antipyrine and calomel are considered incompatible. When rubbed together or in contact, in the presence of moisture at a somewhat elevated temperature, corrosive sublimate is apt to form. The exact chemical reaction which takes place has not yet been established with absolute certainty, but it may be expressed by the following equation:

$$3Hg_2Cl_2 + 2C_{11}H_{12}N_2O + H_2O =$$

Calomel	Antipyrine	Water	
$Hg_2O +$	$2HgCl_2 +$	$Hg_2 +$	$2C_{11}H_{12}N_2O.HCl$
Mercurous Oxide	Mercuric Chloride	Metallic Mercury	Antipyrine Hydrochlor.

As but a small proportion of the calomel is converted into corrosive sublimate, little hesitancy need be had in dispensing antipyrine and calomel, when the latter is prescribed in small doses, as in fractional parts of a grain. (See two articles on this subject, by the writer, in the N. Y. *Med. Jour.* Vol. LXIV, p. 752; and Vol. LXV, p. 223.) I now consider the whole question of antipyrine and calomel of academic interest only. In practice I do not hesitate to prescribe them.

38. Plumbi Acetatis } .....āā 3 j
Zinci Sulph. }
Div. in pulv. No. xii.

If the two ingredients be rubbed together in a mortar a moist mass results, due to chemical interaction: $ZnSO_4 + Pb(C_2H_3O_2)_2 = Zn(C_2H_3O_2)_2 + PbSO_4$ and the consequent liberation of the water of crystallization. The only thing to do is to dispense the lead acetate and the zinc sulphate in separate, differently colored papers, and to direct the patient to dissolve one of each in the prescribed amount of water.

ZINC SULPHATE AND LEAD ACETATE BECOME DELIQUESCENT WHEN RUBBED TOGETHER.

39. Sodii Salicyl. ..... ℥ ij
Syr. Rub. Idaei ..... ℥ ij
Aquae Gaultheriae ..... ℥ iv

Syrup of raspberry contains a small amount of citric acid, which will decompose a small quantity of the salicylate with the formation of sodium citrate and the precipitation of salicylic acid. As the quantity is very small, the prescription may be dispensed as it is, or it may be filtered.

40. Quin. Sulph. ..... ℥ i
Acidi Sulph. Dil. ..... ℥ ii
Potass. Iodidi ..... ℥ v
Syrupi ..... ℥ jss
Aquae ..... ad ℥ iv

This is an example of double incompatibility. The sulphuric acid is incompatible with potassium iodide, forming hydriodic acid, which easily decomposes, iodine being set free; and the potassium iodide, with the free iodine, attacks the quinine sulphate, precipitating it as quinine hydriodide (or "iodide"). In this case it is best to call the physician's attention to the incompatibility. If he insists on having the quinine and the iodide in the same mixture, the sulphuric acid must be left out; the quinine is rubbed up with a portion of the water, the potassium iodide dissolved in the remainder, this solution gradually added to the quinine mixture, and the whole dispensed as a "shake" mixture. Only a small quantity of quinine hydriodide will be formed, the solubility of quinine sulphate being but slight (1 in 725).

41. Pancreatin ..... ℥ j
Bism. Subnitr. ..... ℥ ss
Sodii Bicarbon. ..... ℥ ss
Pulv. Aromatici ..... gr. xxiv
Glycerini ..... ℥ ss
Aquae ..... ad ℥ iij

This mixture frequently explodes, especially when standing in a warm place. Occasionally the bottle is shattered into numerous bits. The reason is referable to the liberation of nitric acid from the bismuth subnitrate, which in its turn acts on the sodium bicarbonate, with the liberation of carbon dioxide. The equation may be expressed as follows:

1. $2BIONO_3 + 2H_2O = BIONO_4 + Bi(OH)_3 + HNO_3$

Bismuth Subnitrate	Water	Bis. Subnitrate	Bis. Hydroxide	Nitric Acid

2. $NaHCO_3 + HNO_3 = NaNO_3 + H_2O + CO_2$

Sod. Bicarb.	Nitric Acid	Sod. Nitrate	Water	Carbon Diox.

As the reactions here described will almost invariably take place sooner or later, the physician's attention should be called to the fact, and the suggestion be made to employ the subcarbonate instead of the subnitrate of bismuth.

42. Strychn. Sulphatis ..... gr. ij
Potass. Bromidi ..... ℥ j
Syrupi ..... ℥ iss
Aquae .....ad ℥ vj

Potassium bromide, as usually found on the markets, is incompatible with strychnine, as it is with most alkaloids, precipitating them in the form of bromides. Chemically pure bromides (and iodides) do not precipitate the alkaloids as readily as do the commercial articles. The latter, in order to be more stable, are crystallized from alkaline solutions, and consequently contain some hydroxide; and alkaline hydroxides are stronger alkaloidal precipitants than the bromides or iodides. To dispense this prescription with the undissolved strychnine bromide would be manifestly unsafe, as too large a dose of strychnine may be poured out in one spoon.

43. Strychn. Sulphatis ..... gr. ij
Potass. Bromidi ..... ℥ j
Syrupi ..... ℥ j
Spir. Frumenti ..... ℥ ij
Aquae .....ad ℥ vj

This prescription may be dispensed, as the alcohol contained therein is sufficient to prevent the precipitation of strychnine bromide. Strychnine sulphate and potassium bromide may be prescribed together, if the vehicle contains from twelve to fifteen per cent. of alcohol.

44. Strychn. Sulph. ..... gr. j
Sodii Phosphatis ..... ℥ j
Magnes. Sulph. ..... ℥ j
Aquae ..... ℥ viij

S.: ℥ ss three times a day.

This is a favorite prescription of an old practitioner for "catarrh," and atony of the stomach, and for loss of appetite. The dose of strychnine, which is rather large, has in no instance produced any bad effects, he claims. Sodium phosphate, being of alkaline reaction, will precipitate the strychnine. This can be easily prevented by adding a few drops of phosphoric acid, so as to neutralize the alkalinity of the sodium phosphate.

45. Argenti Nitratis ..... gr. vj
Ext. Glycyrrhizae ..... gr. xij
Pulv. Althaeae ..... q.s.

M. ft. pil. No. xij.

If the full medicinal virtues of the silver nitrate are to be preserved, it should not be prescribed with organic matter, by which it is readily decomposed. Licorice or althea should, therefore, not be used as excipients in silver nitrate pills. Still more objectionable is an excipient prescribed by physicians of the old school. I refer to "mica panis," or crumb of bread. Beside being organic matter, bread contains salt (sodium chloride), which effectually decomposes the nitrate, silver chloride resulting. The best excipient to use in making these pills is kaolin or argilla alba (which is, chemically, a silicate of aluminum), with a minute quantity of anhydrous woolfat. Instead of the woolfat, some recommend vaselin; but the latter possesses no adhesive properties, and it is difficult to make a presentable pill mass with kaolin and vaselin.

SILVER NITRATE IS INCOMPATIBLE WITH ORGANIC SUBSTANCES.

46. Argenti Nitratis ..... gr. x
Acidi Carbolici ..... gr. vj
Hydrastis Aquosi ..... ℥ ss
Glycerini ..... ℥ ij
Aquae .....q.s. ad ℥ iv
S.: Use as an injection.

This is a favorite prescription of a prominent Brooklyn physician. He claims he gets good results from it, but it is certainly not the silver nitrate that gives the good results, as there is no nitrate left in the prescription; it becomes decomposed by the organic substances. If we want silver nitrate in solution with its unimpaired properties, only distilled water should be used, nothing else.

47. Argenti Oxidi ..... gr. x
Ext. Glycyrrhiz. Pulv. ..... gr. xv
Glycerini ..... q.s.
M. ft. pil. No. xxx.

Not only is silver oxide incompatible with organic matter, being decomposed by it, but the liberation of oxygen may cause a miniature explosion. Perforating the lid of the box or dispensing in a loosely stoppered vial is no remedy, because in being evolved from the pills, the gas often breaks the pills into little bits. The real remedy is to use no organic excipients, only kaolin (with a bit of anhydrous woolfat), as recommended for pills of silver nitrate.

48. Argenti Nitratis ..... gr. v
Sodii Chloridi ..... gr. x
Aquae Destillatae ..... ℥ iv
S.: Use an injection.

This prescription was written by a medical practitioner of the Eclectic School, and was dispensed by a druggist, after having been filtered. The doctor having learned that the severe burning caused by silver nitrate can be effectually

stopped by a subsequent injection or application of a solution of sodium chloride, thought he would simplify matters and save time and labor by ordering both ingredients in the same prescription. That there was no silver nitrate left in the bottle, need not be dwelt upon, as it is almost presumption to tell intelligent readers that sodium chloride decomposes silver nitrate into the insoluble and inert silver chloride.

SILVER NITRATE IS INCOMPATIBLE WITH SOLUBLE CHLORIDES.

49. Bismuthi Subnitr. ..... ℥ ij
Sodii Bicarbon. ..... ℥ i
Mucil. Acaciae ..... q.s.
Div. into pil. No. xxiv.

As explained in Prescription No. 41, bismuth subnitrate and sodium bicarbonate are somewhat incompatible, carbon dioxide being evolved. These pills would swell and break up. This may be avoided by using the subcarbonate of bismuth instead of the subnitrate, or by using an excipient practically free from water, such as glycerite of starch.

50. Acidi Chromici ..... ℥ ss
Alcoholis ..... ℥ ij
S.: Use externally.

Of all the oxidizing official chemicals, such as potassium chlorate, potassium permanganate, etc., chromic acid is the most so. This prescription should not be compounded under any circumstances. Chromic acid should never be brought in contact with any kind of organic oxidizable matter, as a dangerous explosion may take place. Great care should also be taken in handling it, as it destroys any animal tissue with which it comes in contact.

CHROMIC ACID (CHROMIUM TRIOXIDE) SHOULD NEVER BE PRESCRIBED WITH ORGANIC SUBSTANCES.

51. Potass. Permangan. ..... gr. x
Glycerini ..... ℥ j
Aquae ..... ℥ ij
S.: Use externally.

52. Potass. Permangan. ..... gr. xxx
Pulv. Liquiritiae
Ext. Gentianae .....āā q.s.
M. ft. massa in pilul. No. xxx dividenda.

The remarks made regarding silver nitrate are applicable with still greater force to potassium permanganate. The latter is exceedingly sensitive to organic matter; it gives off its excess value as an oxidizer with the utmost readiness. Its value as an oxidizer and disinfectant depends upon the oxygen it liberates *in statu nascendi*. It is self-evident, therefore, that in combining it with organic matter (or with oxidizable inorganic matter) its usefulness is entirely destroyed. When ordered in solution, it should be prescribed with distilled water only. For pills, kaolin with anhydrous woolfat is to be employed as the excipient. Or, what is preferable, the permanganate is intimately mixed with kaolin or talcum and filled into capsules (dry). It is also worth remembering that when a solution of potassium permanganate is used externally as an application, a considerable portion of it is destroyed by contact with the cotton swabs, or lint employed as a dressing, etc.

53. Pulv. Calaminaris
Zinci Oxidi } .....āā ʒ iss
Acidi Carbolici ..... ʒ iv
Aquae Calcis ..... ℥ ij
Aquae Rosae .....q.s. ad ℥ iv
Apply frequently and freely.

There is no incompatibility in the prescription, but it is a good example of how a printer's error, combined with ignorance on the part of physician and druggist, may lead to a disastrous accident. I was asked by a physician to see in consultation a baby, to whom he had the day before prescribed the above lotion. (The child had an eczematous and urticarial eruption.) On calling the next morning, the child was much worse; it had screamed badly when the lotion was applied, refused to take the breast, had passed no water, was

very restless; in short, it seemed dangerously ill. By the aid of a catheter, I drew off some urine, which was of a greenish color and highly albuminous. I diagnosticated carbolic acid poisoning, instituted the proper treatment, and in three days the child was well. I asked him what he had prescribed; on seeing the prescription, I told him that the carbolic acid was excessive; that this was a well-known formula, but that ½ dr., not 4 dr. is always used to 4 ozs. He afterward mailed me the page from the journal from which he had copied the formula, and indeed the formula had it ½ oz.! Of course, both the physician and the pharmacist are to blame in this instance. The pharmacist should have borne in mind that half an ounce of carbolic acid cannot be dissolved in three and one-half ounces of water, and that it is very dangerous—in fact, it is absolutely inadmissible—to dispense a mixture with carbolic acid held in suspension, i. e., not in perfect solution.

℞. Zinci Sulphatis ..... gr. xxiv
Plumbi Acetatis ..... ʒ j
Aquae ..... ʒ vi
S.: Use externally as directed.

Though this prescription is incompatible, it is one of the most common examples of *desirable* or intentional incompatibility. Many practitioners stick their faith to the above recipe, considering it a ne-plus-ultra injection in gonorrhea; and there seems to be no doubt that the sulphate of lead exerts a beneficial protective influence on the mucous membrane of the urethral canal, while the zinc acetate has a non-irritating astringent effect. The reaction which takes place is a very simple one:

$$ZnSO_4 + Pb(C_2H_3O_2)_2 = Zn(C_2H_3O_2)_2 + PbSO_4$$

There is no difficulty in making up this prescription. But how often, in seeing this prescription made, was I able to distinguish between the good pharmacist and the bad pharmacist. There is not a thing, be it ever so small, that cannot

be done either rightly or wrongly. An ounce of zinc ointment may be made well or poorly. The careless pharmacist, with slipshod methods, with no love for his profession, will take the zinc sulphate and the lead acetate and throw them into a bottle, which he will then fill with water and dispense, after a few efforts at shaking. This will make a lumpy mixture, which may prove quite irritating. The real, true pharmacist, who wants to prepare this prescription *lege artis*, will proceed as follows: He will boil 6 fl. ozs. of distilled water and dissolve the zinc sulphate in 3 fl. ozs., of it, and the lead acetate in the remaining 3 fl. ozs. Should the solution of the latter be somewhat cloudy, in consequence of the exposure of the lead acetate to the air (lead acetate eagerly absorbs carbon dioxide, forming lead carbonate), he will add a drop or two of acetic acid; he will then filter the solutions separately, and will mix the filtrates gradually, under constant agitation. Prepared in this manner, the lead sulphate will be in a very fine state of subdivision. What a pity that not all pharmacists are imbued with the sacredness of their calling. But in most cases it is thoughtlessness. If they but knew what a difference it may make in the results of treatment, they would devote a little more care and attention to the performance of their professional duties.

55. Hydrarg. Chlor. Corrosivi ..... gr. vj
Kali Iodati ..... ʒ ij
Chinini Mur. ..... ʒ ij
Strych. Sulph. ..... gr. ij
Tr. Gentian. Comp. ..... ℥ j
Syr. Sarsap. Comp. ..... ℥ ij
Aquae .....ad ʒ vj

This prescription belongs to a class which is unfortunately very common. The physicians of the younger generation have it impressed upon their minds that for a syphilitic patient tonic treatment is just as important as the specific one. Consequently, they are very apt to attempt to combine in one mixture the mercurials and iodides with the tonic alka-

loids. Had the physician tried his utmost to get the quinine and the strychnine precipitated he could not have done any better than to prescribe them with corrosive sublimate and potassium iodide. Each of these chemicals alone will precipitate alkaloids, but when combined they form the so-called "Mayer's solution of iodohydrargyrate of potassium," which is one of the most potent general alkaloidal precipitants. To dispense the prescription as written is certainly a dangerous procedure, as the patient may get too large a dose of strychnine. The best thing is to communicate with the physician. If this is not feasible, I would leave out the strychnine on my own responsibility, and impress upon the patient the importance of shaking the bottle each time; and I would inform the physician by mail, so that he can order the strychnine separately, in the form of pills or tablets.

ALKALOIDS SHOULD NEVER BE PRESCRIBED IN A MIXTURE CONTAINING MERCURIC CHLORIDE AND POTASSIUM IODIDE. THERE IS SURE TO BE A MUTUAL PRECIPITATION.

56. Hydrarg. Bichlor. 0.12
Potass. Iodidi 10.0
Tr. Cinchon. Comp. 60.0
Syr. Sarsap. Comp. 15.0
Aquae .....q.s. ad 120.0

The remarks made in the preceding prescription apply to this one as well, except, of course, that there are no poisonous alkaloids. The bichloride and the iodide will precipitate the alkaloids of the cinchona. The bichloride will also be affected by the tannic acid in the cinchona. (Corrosive sublimate is a very delicate agent, and should be prescribed as little in combination as possible.) But, as many physicians insist on prescribing the above mixture, it should be dispensed with a "shake" label.

57. Tr. Ferri. Mur. 10.0
Tr. Chinae 100.0

This is a favorite prescription with many German prac-

titioners, and is known in some drug stores by the name "German ink." The cincho-tannic acid combines with the iron, producing tannate of iron, yielding a greenish-black, inky mixture. But as the physicians prescribing it are aware of the change of color in this mixture, and do not mind it, the pharmacist must not interfere. After all, appearance is not everything; and, as some one has said, "a nasty medicine is preferable to a nice funeral."

58. Quin. Sulph. ..... ℥ i
Acidi Sulph. Dil. ..... q.s.
Ext. Glycyrrhiz. Fl. ..... ℥ ss
Syrupi ..... ℥ i
Aquae .....ad ℥ iii

This is an old and well-known prescription incompatibility. The dilute sulphuric acid works double mischief. First, by dissolving the quinine, it renders the mixture intensely bitter; secondly, by precipitating the glycyrrhizin from the fluidextract of glycyrrhiza, the sweetening or disguising property of the latter is completely destroyed. Omit the sulphuric acid, and dispense the prescription as a "shake" mixture.

59. Sol. Magendie ..... ℥ ii
Sol. Potass. Iodidi Satur. ..... ℥ vi
S.: Gtt. x t.i.d. p.c.

The pharmacist should refuse to dispense this prescription. While the dispensing of a non-poisonous alkaloid like quinine in an undissolved form is more a matter of esthetics than anything else, it is entirely different when we have poisonous principles to deal with. Poisonous alkaloids are to be dispensed in liquid mixtures only when they are in perfect solution and when there is no danger of their subsequent precipitation. Within a very short time, silky needles will begin to deposit, and eventually all the morphine will be precipitated out as morphine hydriodide. That it would be a very dangerous thing to take this medicine by drops, requires no argument.

60. Potass. Chloratis ..... ℥ iss
Acidi Hydrochlor. ..... ℥ i
Glycerini ..... ℥ i
Aquae .....ad ℥ iv
S.: As directed, on a cotton swab.

The making up of this prescription will depend greatly on the physician's directions and on the knowledge as to how it is to be employed. When prescribed in diphtheria, to be used for swabbing the throat, the physician generally wants the solution to contain free chlorine. In this case, the prescription is compounded just as written; i. e., the hydrochloric acid is poured directly on the potassium chlorate (crystals). This generates free chlorine. When the reaction seems to be completed, the water is added, and then the glycerin. However, if wanted for internal use, or when the evolution of chlorine is not desired, the potassium chlorate should be dissolved in the water and mixed with the glycerin, and then the hydrochloric acid should be added last. If made in this manner, no chlorine will be evolved.

61. Potass. Chloratis ..... ℥ i
Tr. Ferri Chloridi ..... ℥ i
Glycerini ..... ℥ i
Aquae .....ad ℥ vi
S.: ℥ ss as directed.

I used to dispense this prescription daily, and several times a day, because I knew how it was to be employed; a tablespoonful was to be mixed with a cupful of warm water and used as gargle. But should the directions not be known, the prescription should not be dispensed. Were the dose even a teaspoon instead of a tablespoon, I would hardly dispense it; not because the dose (ten grains) of potassium chlorate would be an excessive one—it is rather large, and physicians are of late very cautious in administering large doses of $KClO_3$—but because the chemical is not dissolved; and undissolved, potassium chlorate is extremely irritating to the throat and stomach. But where the physician is aware

of the circumstances and insists on the prescription being dispensed as written, the druggist has no alternative but to obey.

62. Calomelanos ..... gr. v
Potass. Bromidi ..... gr. v
Sacch. Lactis ..... gr. v
Ft. tal. doses No. xxx.

This prescription is a dangerous one, and should not be dispensed under any circumstances. A reaction takes place between the mercurous chloride and potassium bromide, with the formation of mercuric bromide, a very poisonous compound. The equation is as follows:

$$2HgCl + 4KBr = Hg + HgBr_2 + 2KBr + 2KCl$$

Calomel — Potass. Bromide — Mercury — Mercuric Bromide — Potass. Bromide — Potass. Chloride

The presence of water or moisture seems to be necessary for the reaction to take place, because if the potassium bromide is dried, so that all interstitial moisture is driven off, no change occurs in the mixture. The reaction occurs immediately, however, on the addition of water (which is present also in the gastric juice). Even when administered separately, calomel and potassium bromide should not be given at too short intervals apart; a period of one or two hours should intervene, so as to avoid the possible danger of the formation of mercuric bromide in the stomach.

63. Sol. Natrii Bicarbon., 25% ..... ℥ viij
S.: Apply externally all over the body, with a piece of cotton.

This is a short prescription, but a very interesting tale goes with it. It was presented to me in my early junior days. One of the first things I committed to memory—and I would recommend all drug-clerks to do the same—was the solubility of the commonly employed chemicals. I, therefore, saw at once that there was no possibility of making a twenty-five per cent. solution of sodium bicarbonate, and so told

the proprietor; the strongest solution that can be made is about eight per cent.

"Well," said he, "you have not had very much experience, I see; I'll make the solution all right." He then weighed out two ounces of sodium bicarbonate, took eight ounces of water (the right quantity would have been six ounces), put both in a dish, and brought the solution to boiling. A clear solution resulted. "But won't it precipitate on cooling?" remonstrated I, mildly. "Wait and see." The solution became cold and remained perfectly clear. With a look of triumph, the "boss" delivered it, and very satisfied was he. However, the next morning the doctor who prescribed the solution came to the store in a perfect rage. We must have made a mistake, a terrible mistake; we must have put in some poisonous stuff, some caustic; it nearly killed the baby; the eruption became much worse; the itching was intolerable, etc., etc.

Now, what had taken place? Simply this: Any bicarbonate in solution, when strongly heated or boiled, becomes converted into a carbonate, according to the following equation:

$$2NaHCO_3 + \text{heat} = Na_2CO_3 + CO_2 + H_2O.$$

The solution delivered was consequently not one of sodium bicarbonate, but a strong solution of sodium carbonate. It was to be applied to a little baby that had a slight eruption. No wonder that it produced such great injury! The child's suffering could be allayed only by wrapping the whole body in lint soaked in carron oil; and it took quite a long while before it got well. My proprietor never afterward dispensed a twenty-five per cent. solution of sodium bicarbonate.

64. Tr. Ferri Chlor. ..... ℥ ij
Glycerini ..... ℥ ss
Aquae Gaultheriae ..... ℥ iij

What will take place in this prescription? It assumes a beautiful violet-blue color. What is this due to? Oil of win-

tergreen consists principally of methyl salicylate, and all salicylates are incompatible with ferric salts, forming ferric salicylate, which is of a deep violet-blue color. The reaction is explained by the following equation:

$$2FeCl_3 + 6CH_3C_7H_5O_3 = Fe_2(C_7H_5O_3)_6 + 6CH_3Cl.$$

While some physicians may prescribe it, being unfamiliar with the facts, I knew one physician who used to prescribe this mixture purposely, in order not to let his patients know that they were taking iron.

65. Tr. Ferri Chloridi ..... ℥ ij
Kali Chloratis ..... ℥ j
Antipyrini ..... q.s.
Glycerini ..... ℥ j
Aquae .....ad ℥ iij

The "antipyrini, q. s.," shows that the physician wants the antipyrin only for the color it produces with the iron. As the "yellow throat mixture" is too well known, some physicians prefer to make their patients believe that they are taking something new. *Antipyrin produces a deep-red color with ferric salts.*

66. Natrii Salicyl. ..... ℥ ss
Spir. Nit. Dulcis ..... ℥ j
Syr. Simpl. ..... ℥ j
Aquae .....ad ℥ viij

When dispensed this is a perfectly clear solution, but gradually it begins to darken until it is almost black. This darkening is due to a reaction between the sodium salicylate and the spirit of nitrous ether. The patient is likely to bring back the mixture, asking if a mistake had not been made, or if it did not get spoiled. It is therefore imperative to inform the patient that this mixture will get dark; he will then not be alarmed. The exact nature of the reaction between the salicylate and the nitrous ether, as between antipyrin and nitrous ether, and many other organic compounds, is not well understood. I will remark here that where no de-

tails are given as to the reaction which takes place, it is because no definite statement can be made. To go into speculation would lead us too far and would hardly prove very useful to the reader.

67. Ammon. Carbon. ..... 3 ij
Syr. Ipecac. ..... 3 ij
Syr. Scillae ..... ℥ ss
Syr. Prun. Virgin. ..... ℥ j
Aquae .....ad ℥ iij
S.: 3 i q. 3 h. until cough is relieved.

The acetic acid present in both the syrup of squill and the syrup of ipecac will decompose the ammonium carbonate, producing ammonium acetate and carbon dioxide. The mixture should, therefore, be made in a mortar, and poured into the bottle only after the evolution of CO_2 has ceased.

Acids Liberate Carbon Dioxide from Carbonates.

68. Liq. Plumbi Subacet. ..... ℥ ij
Mucil. Acaciae ..... ℥ iv
Aquae .....ad ℥ xvj
S.: Dip a cloth and keep constantly wet.

Solution of lead subacetate forms such a thick, gelatinous mass with mucilage of acacia that a cloth cannot be dipped into it or kept constantly moist with it. Two ways are open: either to leave the mucilage out, or, better, to substitute lead acetate for lead subacetate, as lead acetate gives no precipitate with mucilage of acacia. Liq. Plumbi Subacet. being about 25 per cent. strong the proper quantity of lead acetate would be about half an ounce.

Solution of Lead Subacetate Gives a Thick Gelatinous Precipitate with Mucilage of Acacia.

68. Acidi Salicylici ..... 3 ij
Natrii Bicarb. ..... 3 jss
Syr. Aurantii Cort. ..... ℥ j
Aquae Menthae .....q.s. ad ℥ vj

According to the books, an acid and an alkali are incom-

patible, but *this* is a kind of incompatibility that physicians would do well to practice more than they do. The salicylic acid and the sodium bicarbonate react with one another, and the freshly formed sodium salicylate is the result, thus:

$$NaHCO_3 + HC_7H_5O_3 = NaC_7H_5O_3 + CO_2 + H_2O.$$

The proper way is to dissolve the $NaHCO_3$ in the water in a mortar, add the salicylic acid, stirring until dissolved, filtering rapidly, adding the syrup and waiting until all the CO_2 is expelled before bottling. Many practitioners believe that this freshly prepared salicylate is superior to the ready made article. That it is more acceptable to the stomach is a fact.

70. Acidi Salicylici ..... ℥ v
Natrii Bicarb. .....q.s. ad saturationem
Syr. Rub. Idaei ..... ℥ j
Aquae Gaultheriae ..... ℥ viij

The physician desires the apothecary to supply the necessary quantity of sodium bicarbonate to neutralize the salicylic acid. It cannot be expected that a physician should know the proper quantities of alkalies required to neutralize certain quantities of acids and vice versa, but the pharmacist should know it; it is his business to know such things, and such questions should be met with frequently in our Board of Pharmacy examinations. Unfortunately, there are many druggists to whom such problems are about as intelligible as Chinese is. They are not aware even of the fact that at the end of the Pharmacopeia there are tables which give the exact quantities of acids and alkalies required for mutual neutralization. Until our examinations become more practical and more stringent, such state of affairs will continue to exist. One hundred parts of salicylic acid require for complete neutralization 62 parts of sodium bicarbonate; for practical purposes it is enough to remember the proportion of 5 to 3. Consequently, 5 dr. of salicylic will require 3 dr. (more exactly 3 dr. and 6 grn.) of sodium bicarbonate.

The order of procedure is the same as in the previous prescription.

71. Extr. Uvae Ursi Fl. ..... ℥ ss
Spt. Aetheris Nitrosi ..... ℥ j
Spt. Juniperi Comp.
Ext. Tritici Fl. .....āā ʒ ij
Syrupi Simplicis et Aquae aa .....ad ℥ iv

I know a druggist whom the improper putting up of this prescription cost the price of a pair of trousers. The customer put the bottle in his pocket, but returned in a minute with the dark liquid trickling down his white trousers, and full of angry words at the druggist for his carelessness in not corking the bottle properly, etc. The druggist denied the allegation, and said it must have been the man's own fault, but agreed to make up another bottle without extra charge. Unfortunately, while handling this second bottle, the cork popped out with quite an explosion, striking the man's face with considerable force, bespattering his white front, etc. To avoid any scenes, and to get rid of the man before the return of the boss, the poor drug clerk agreed to "settle" with the man and return him the prescription.

I once experimented with a similar mixture to see how long the evolution of the gas would last. Fourteen times, at gradually increasing intervals, the cork popped out. The fifteenth time it stayed in. The gas which is evolved consists of various oxides of nitrogen. The statement is generally made that this evolution of gas is due to the action of the nitrous acid on the tannic acid of the uva ursi. It is true uva ursi contains a very large percentage of tannic acid, but the latter must differ somewhat in its properties from the ordinary tannic acid, or there must be another constituent co-active in the reaction. I am impelled to this belief by the fact that when spirit of nitrous ether is mixed with tannic acid, the volume of gas evolved is very insignificant; there is a red color produced, due most probably to the formation of a small quantity of nitrogen tetroxide, but

hardly ever is there sufficient gas to expel the cork. The ingredients should be mixed in a large graduate or mortar; ample time should be allowed for the evolution of gas to cease, and after the bottle is corked enough time should elapse before delivering it, to make sure that the cork will not come out (or it may be tied with a string). The nitrous ether is completely spoiled, decomposed, in this prescription, and might as well have been left out by the physician.

72. Fluid Ext. Buchu
Spt. Aetheris Nitrosi
Spt. Junip. Comp. .....āā 30.0
Syr. Rub. Idaei 15.0
Aquae 60.0

A reaction similar to the one in the preceding prescription takes place in this, i. e., there is evolution of gas, liability to explosion, etc. The same remarks about dispensing apply to this one.

73. Potass. Iodidi ..... ʒ ij
Syr. Ferri Iodidi ..... ʒ ijss
Aquae ..... ℥ jss

I prescribe this combination very frequently, and sometimes I will find a precipitate and sometimes not. If chemically pure potassium iodide be used, no precipitation will take place. Commercial KI is crystallized from a solution of potash (which gives it better keeping qualities) and contains, besides, as an impurity, a small amount of potassium carbonate. It is the hydroxide (with the carbonate) which produces a precipitate of ferrous hydroxide. In cases where no precipitate is found, it is probably due to one of two causes; either it is filtered out, or the syrup of iodide of iron was not made properly, and contained an appreciable quantity of free iodine; the latter combined with the KOH, and thus prevented precipitation. In no case was it referable to the employment of chemically pure KI, as none of the druggists kept this in stock; it is prone to liberate iodine and become discolored.

74. Acidi Phenylici ..... ℥ ij
Collodii ..... ℥ vj
S.: Apply with camel's-hair brush night and morning.

When carbolic acid is added to collodion, a coagulated mass forms, which cannot be applied with a brush. Besides, the property of the collodion becomes changed; i. e., the collodion becomes useless as such. The physician's attention should be called to these facts, and the suggestion made to him to employ creosote instead of phenol. Creosote forms a clear solution with collodion.

Carbolic Acid Is Incompatible with Collodion: a Coagulated Mass Is Formed.

75. Hydrargyri Chlor. Corros. ..... gr. vj
Aquae Calcis ..... ℥ iv
Aquae Plumbi
Aquae Destill. .....āā ℥ ii
S.: Poison! For external use only.

This prescription admirably serves to illustrate what different results we may obtain in some instances by a different order of mixing the ingredients, and how absolutely necessary it is, therefore, to take note of the exact order observed. If the solution of corrosive sublimate be poured into the lime water, yellow mercuric oxide will be formed; if the lime water be poured into the solution of the corrosive sublimate, brown mercuric oxychloride will precipitate. The subsequent addition of the lead water to this mixture will not change the result, and the patient will receive a shake mixture with a yellow or brown precipitate. If, on the other hand, the mercuric chloride solution is added at once to the lead water, a milky white homogeneous mixture is obtained, which remains unchanged by the subsequent addition of the lime water. As to the exact chemical composition of this precipitate, my impression is that it is a basic acetate of mercury, together with some lead chloride; it is also possible that a double compound of mercury and lead

is formed. For practical purposes it is sufficient to know that the reaction does not take place with the neutral lead acetate.

I have also seen this prescription dispensed as a perfectly clear, colorless solution. On investigating the following cause was discovered: Some druggists invariably add to their liquor plumbi subacetatis a little acetic acid for the intended purpose of preventing its becoming turbid on exposure or on being mixed with plain water. That they thus destroy all their work and convert the basic acetate into a normal one does not enter their minds. At any rate, when the mercuric chlorid is mixed with such a lead water no precipitation will take place nor will there be any reaction on the addition of the lime water. The mercuric chloride will remain unimpaired and unchanged; but we must not forget that instead of lead subacetate we have lead acetate, and instead of calcium hydroxide we have calcium acetate.

76.	Sol. Hydrarg. Perchlor. Sat.	℥ j
	Aquae Calcis	℥ v
	Mucil. Acaciae	℥ j

Here is another example where the order of mixing the ingredients controls the results. If the solution of the corrosive sublimate is poured into the lime water, yellow mercuric oxide is formed; if the lime water is added to the solution of the bichloride, the reddish-brown oxychloride of mercury precipitates. If the corrosive-sublimate solution is mixed with the mucilage of acacia and then with the lime water, precipitation will be prevented altogether or for several days at any rate. The mucilage of acacia must be the true U. S. P. mucilage and not one of those dark, almost black, sour-smelling products which pass for mucilage of acacia in some drug-stores.

77.	Sol. Kalii Arsenicosi	10.0
	Argenti Nitrici	0.5
	Syr. Sacchari	25.0
	Aquae Menthae	125.0

This prescription presents a triple incompatibility. The potassium carbonate present in Fowler's solution will precipitate the silver as silver carbonate; another portion of the silver will combine with the arsenite, precipitating it as the bright-yellow silver arsenite; and lastly the silver nitrate is incompatible with the sugar of the syrup and with the peppermint water. As the prescription stands it should not be dispensed; but it can be made dispensable. By acidifying the Fowler's solution two objects are gained: The potassium carbonate is neutralized, and thereby precipitation of the silver arsenite is prevented (the latter does not take place in an acid solution). When Fowler's solution is acidified for combination with alkaloidal salts, etc., hydrochloric acid is usually employed. In the present case HCl cannot be used, as it would precipitate the entire amount of silver as silver chloride; the most eligible acid in this case is nitric acid. The simple syrup should be left out altogether; and instead of peppermint water distilled water should be used. The compound tincture of lavender of the arsenical solution would also tend to decompose the silver nitrate. As there are so many radical changes necessary, it is best to consult the physician.

78. Tr. Strophanthi ..... ℥ i
Spirit. Mindereri ..... ℥ iv
Tr. Ferri Chloridi ..... ℥ i
Glycerini ..... ℥ j
Aquae .....q.s. ad ℥ viij
S.: ℥ ss three times a day.

This prescription was received with a query as to what the brown precipitate was due to and whether it could be prevented. The cause of the precipitation is this: Solution of the ammonium acetate is frequently alkaline; that is, it contains some ammonium carbonate which has not been neutralized. This later produces a precipitate of ferric oxide. To avoid this a little extra acetic acid should be added to the spirit of Mindererus (as the U. S. P. directs),

to make sure that it is acid, and then only mix it with the tincture of iron. When thus made a clear, transparent, bright-red solution is the result. The bright-red color is due to the ferric acetate formed, according to the following equation:

$$FeCl_3 + 3NH_4C_2H_3O_2 = Fe(C_2H_3O_2)_3 + 3NH_4Cl.$$

The Pharmacopeia directs Basham's mixture to be made fresh when wanted for use; and in examinations the question frequently occurs: "Is Basham's mixture a stable preparation?" and the candidate is expected to answer that it is unstable. Accepting the term "stable" in its ordinary interpretation, the writer wishes to take issue with the examiners, and say that, if properly made, Liquor Ferri et Ammonii Acetatis, U. S. P. IX, is quite a stable solution. He made observations on several samples, and in three or four weeks no trace of decomposition was discoverable. The explanation of the assertion that the solution in question is very unstable is perhaps to be found in the fact that Basham's mixture made according to the old pharmacopeias was quite unstable, as it contained no protective agent such as is called for in the present formula, i. e., glycerin.

79. Liq. Potassi Arsenitis ..... ʒ ij
Ferri Dialysati ..... ʒ ij
Aquae Anisi ..... ℥ ij

This is an example of double incompatibility. The potassium carbonate in the Fowler's solution will precipitate ferric carbonate, which is almost immediately converted into ferric hydroxide. This with the potassium arsenite forms a basic ferric arsenite which precipitates. It will be remembered that freshly prepared ferric hydroxide is the official antidote for arsenical poisoning, because it combines with the arsenic preparations, forming insoluble arsenites and arsenates. It sometimes happens that no precipitation takes place. If this is the case, it may be assumed that the

dialyzed iron has not been properly made, i. e., that it contains free acid. The free acid neutralizes the alkali in Fowler's solution, forming potassium chloride, and preventing precipitation. Dialyzed iron, when properly and conscientiously made, is neutral. The way to make up this prescription is to neutralize the Fowler's solution with a few drops of hydrochloric acid (or to take Liquor Acidi Arsenosi instead), add it to the anise water and the mixture to the dialyzed iron.

80. Pepsini Puri ..... ℥ ij
Acidi Hydrochlor. Dil. ..... ℥ ij
Bism. et Ammon. Citratis ..... ℥ iij
Syrupi Aurantii ..... ℥ j
Aquae Menthae .....ad ℥ iv
S.: ℥ j t.i.d., in Vino Xerico.

The existence of bismuth and ammonium citrate in the United States and British Pharmacopœias is a good example of misplaced zeal and misdirected energy. It, as well as bismuth citrate, should be dropped from the next revision. There is not a single disease of the gastro-intestinal canal where the insoluble salts of bismuth—the subnitrate and the subcarbonate—do not act better than this soluble salt. In many conditions—such as ulcer of the stomach, ulceration and inflammation of the bowels—the bismuth subnitrate, subcarbonate, etc., act well just because of their insolubility; i. e., they form a protective coating to the mucous membrane, and thus prevent the acids from coming in direct contact with it, while there is not a single condition in which a soluble bismuth salt is indicated. Another important point is, that the subnitrate and subcarbonate, being insoluble, can be given in very large doses (some physicians give as much as two to four drams at a dose) without any danger of producing toxic effects. Even the supposed advantage of the salt in question—its solubility—is a very uncertain quantity; i. e., it loses the ammonia rapidly, and the solubility becomes

impaired. Bismuth and ammonium citrate is soluble only in an alkaline or in a perfectly neutral solution. In this prescription the hydrochloric acid decomposes it, forming ammonium chloride and bismuth citrate precipitating. Gradually the bismuth citrate will also be changed by the HCl into bismuth chloride and oxychloride.

The reactions may be expressed as follows:

I. $BiC_6H_5O_7(NH_4)_3C_6H_5O_7 + 3HCl = BiC_6H_5O_7 + 3NH_4Cl + H_3C_6H_5O_7$

II. $BiC_6H_5O_7 + 3HCl = BiCl_3 + H_3C_6H_5O_7$

III. $BiCl_3 + H_2O = BiOCl + 2HCl$

The above prescription may be dispensed, but it is just as well to take the citrate of bismuth from the start as to take the double salt and have the citrate precipitated out.

81. Solut. Fowleri 10.0
Tr. Ferri Chloridi 20.0
Glycerini 30.0
Aquae 60.0
S.: Cochlear parvum post prandium.

One would think that the potassium carbonate in the Fowler's solution would precipitate the iron. This is not the case, however, because the free HCl in the tincture neutralizes the potassium carbonate; carbon dioxide is given off, which is seen by the active effervescence which takes place when the tincture and the liquor are mixed. The directions are: A teaspoonful—literally a small spoon—after dinner. (I would advise the readers, especially the young drug clerks, to pay attention to the directions in the presented prescriptions; they may thus learn many common Latin expressions.)

82. Spir. Ammon. Arom. ..... ℥ j
Tr. Ferri Chlor. ..... ʒ ij
Quinin. Sulph. ..... ʒ ss
Tr. Digitalis ..... ʒ ij
Glycerini ..... ʒ iss
Aquae ..... ad ℥ viij

There are three kinds of incompatibility in this prescription, which the doctor insisted on having dispensed just as written. The tincture of iron does not contain enough hydrochloric acid to neutralize all the ammonia water and ammonium carbonate present in the aromatic spirit. There will consequently be a precipitate of ferric hydroxide. The second thing the spirit will do, is to precipitate the quinine, which would otherwise have been readily dissolved by the tincture of iron (due to its containing free HCl); the third point is the tannin of the digitalis will yield a greenish-black color with the iron. As to dispensing the prescription, I will repeat: As long as there is no dangerous poison in the mixture and the doctor wants to have it that way, let him have it. A fourth point of incompatibility might be mentioned: The separation of the oils from the aromatic spirit by the water; but this is of little importance in comparison with the other difficulties.

83. Ferri Pyrophosphatis ..... ʒ ij
Acidi Phosphorici Dil. ..... ʒ iij
Syr. Rub. Idaei ..... ℥ j
Aquae ..... ℥ iv

Practically everything said in regard to soluble ferric phosphate (see prescription 111) is applicable to ferric pyrophosphate, as the latter is, like the phosphate, made soluble by the aid of sodium citrate. The phosphoric acid will decompose the soluble ferric pyrophosphate and cause a precipitate.

84. Potassii Chloratis ..... ℥ j
Acidi Tannici ..... ℥ ss
S.: 3 j in cup of hot water, for a gargle.

I felt almost like apologizing for putting down this prescription, it is so old and so well known. But I suddenly recollected the accident in Greenwich street, where a drug clerk blew up half the store and nearly lost his life from the injudicious handling of potassium chlorate and sodium sali-

cylate, and then I saw that no apology was necessary. It is just those easy, well-known things that need be constantly kept in mind, constantly referred to. Potassium chlorate is a great oxidizing agent. An oxidizing agent is a substance which readily gives up its oxygen to other compounds. To the oxidizing agents belong the chlorates, nitrates, permanganates, chromates, etc. Oxidizable substances are such as readily combine with oxygen. To the easily oxidizable substances belong sulphur, phosphorus and most organic substances. If the potassium chlorate were rubbed rather vigorously with the tannic acid in a mortar, an explosion would almost surely result. The right way is to powder the potassium chlorate separately (and even this must be done gently, because even if rubbed violently by itself an explosion is apt to result) and mix lightly with the tannic acid on a sheet of paper by the aid of a horn spatula. Instruct the patient to be careful.

85. Potass. Permangan. ..... ℥ ss
Acidi Tannici ..... ℥ ij
Alum. et Potass. Sulph. ..... ℥ iv
Acidi Borici ..... ℥ xij
M. et ft. pulvis secundum artem.
S.: ℥ ss in 4 qts. of hot water, as a douche every morning and night.

The remarks on the previous prescription apply also to this. The permanganate should be first powdered carefully (it need not be in a fine powder) by itself, then mixed with the boric acid, alum and lastly with the tannic acid. It may be remarked that the physician might as well have left out the permanganate, because when the solution is made it is reduced to a manganate by the tannic acid.

86. Acidi Picrici ..... 3 j
Cocainae Mur. ..... 3 ss
Aquae ..... O j
S.: Apply on lint every hour.

This is a somewhat modern prescription. It was written by a well-known physician, who used to be assistant to the Chair of Materia Medica in one of our colleges. Picric acid has been recommended as an excellent remedy for burns. Wishing to obviate any possible burning sensation from the picric acid, the physician orders some cocaine with it; but in doing this he loses sight of the fact that picric acid is an excellent precipitant of almost all alkaloids. When a solution of picric acid is added to a solution of cocaine hydrochloride, the mixture becomes at once turbid, and soon the crystals begin to separate out. There can be no two opinions as to what course is to be pursued in the present case; the cocaine is to be left out. Not only is it useless, because precipitated in an insoluble condition, but if applied in that insoluble form it would do mischief by irritating the tender, recently burned surface. Of course, the physician is to be informed of the facts in the case.

87. Sodii Salicyl. 15.0
Acidi Citrici 5.0
Syr. Rub. Idaei 30.0
Aquae 150.0
Ft. solutio. S.: ℥ ss t.i.d. p.c.

This is another one of those prescriptions which vividly recall to my memory the good old junior days some thirty years ago. One busy afternoon we received the above prescription. The proprietor sent in a very polite note to the physician, telling him that he was no doubt aware of the fact, but it probably had slipped his mind, that citric acid would decompose the sodium salicylate, with the consequent precipitation of the salicylic acid; whether he would not order to leave out the citric acid, or give an equivalent amount of potassium citrate additionally. The physician made no reply, but appeared personally after a short while. "You must be very peculiar in making up prescriptions; I made up that same prescription a dozen times at X's drug store,

and they never made any remarks; I always saw that the patients had a perfectly clear solution." Being of course absolutely certain of our being in the right, we told him that if X obtained a clear solution there was no sodium salicylate in his mixture, and we advised him to take the prescription to X's drug store, go behind the counter and watch the clerk prepare it. He did. The clerk mixed all the ingredients as prescribed, and then filtered the mixture. That physician has since then had a good deal more respect for us than he did for X. The reaction is simple:

$$3NaC_7H_5O_3 + H_3C_6H_5O_7 = Na_3C_6H_5O_7 + 3HC_7H_6O_2.$$

88. Potassii Permang. 1.5
Morph. Sulph. 0.25
Ext. Liquir. ..... q.s. ut fiat massa
in pilulas No. xxiv dividenda.

As explained in a previous prescription (No. 52), potassium permanganate must not be brought in contact with organic matter, as it becomes decomposed. In the present instance there will be a double reaction which will make the pills entirely worthless. The potassium permanganate becomes reduced by the morphine and liquoriee to potassium manganate and manganese dioxide; the morphine becomes oxidized, and has no longer the properties of morphine. The physician should be apprised of the facts in the case.

89. Morphin. Sulph. ..... grn. ij
Spt. Aether. Nitrosi. ..... ℥ ss
Fl. Ext. Bellad. ..... min. xij
Aquae .....ad ℥ ij
S.: 3 j pro re nata.

Morphine with sweet spirit of niter produces a yellow solution, due to the oxidation of the morphine by the nitrous compounds present in the spirit. The prescription may be dispensed, but I would not be astonished if I got little of the anodyne effects of the morphine, and I think the physician

would be thankful if his attention were called to the incompatibility.

90. Morph. Sulph. ..... gr. ij
Liquor. Potassii Hydrox. ..... ℥ ij
Aquae Chloroformi
Fluidext. Tritici
Glycerini .....āā ℥ j

"This prescription is incompatible, because the liquor potassii hydroxidi, being an alkali, will precipitate the morphine." Give this prescription at an examination, and almost every one of those answering it at all would answer it in words indicated above. But this prescription is not incompatible. True, morphine salts are precipitated by potassium and sodium hydroxides, but the precipitates are redissolved by an excess of the alkali. In this case there is more than sufficient solution of potass. hydroxide to redissolve the precipitated morphine and to keep it in solution. If, instead of 2 dr., there were prescribed only a few drops of liquor potassae, the prescription would be incompatible and could not safely be dispensed.

91. Strych. Sulph. ..... gr. j
Liquor Potassii Hydrox. ..... ℥ ij
Aquae Chloroformi
Ext. Tritici Fl.
Glycerini .....āā ℥ j

This prescription is by the same physician who wrote the previous one. That one was for the acute irritable stage of cystitis; after that stage had passed, he prescribed a tonic instead of a sedative. While the first prescription was dispensed without hesitation, it was deemed obligatory to notify the physician that it would not be quite safe to dispense this second one; and he was very thankful for the information, as the really good physicians always are, and ordered the strychnine in tablet form. The reason of the incompatibility is that

strychnine (alkaloidal) is precipitated and is not redissolved by excess of alkali.

92. Liq. Plumbi Subacetatis ..... 3 ij
Solut. Ac. Borici Satur. ..... ℥ vj
S.: Apply externally.

A milky white precipitate results when the two solutions are mixed, due to the formation of lead borate. This chemical is formed only in an alkaline medium. Its formation can therefore be prevented in two ways: either by adding a few drops of acetic acid to the liquor plumbi subacetatis, to neutralize its alkalinity; or by taking an equivalent quantity of lead acetate (in this case, about half a dram). Either expedient is permissible; a perfectly clear solution will result in each case.

Lead Salts Are Incompatible with Boric Acid in an Alkaline Medium.

93. Plumbi Acetatis 0.3
Sodii Biboratis 0.5
Aquae Rosae 40.0
S.: Drop 3 drops into each eye every 4 hours.

The same reaction will take place here as in the previous prescription, but the alkalinity is here due not to the lead salt but to the borax. The mixture should not be dispensed in this condition, especially as it is to be used with an eye dropper. The best thing to do is to use an equivalent quantity of boric acid; the solution will then be perfectly clear. Glycerin will also prevent precipitation. (For a full discussion of this, see the next prescription.) There is something else wrong with this prescription, more important even than the incompatibility; namely, the employment of lead in the eye. Salts of lead should never be employed on the eyeball, as several cases of corneal opacities have been reported from their use, due to the deposition of lead.

Lead Salts Are Incompatible with Borax in Solution: Lead Borate Precipitates.

94. Plumbi Acetatis ..... ℥ ss
Sodii Boratis ..... ʒ j
Glycerini ..... ʒ ss
Aquae .....q.s. ad ℥ iv

This prescription differs from the preceding one in that it contains an additional ingredient, glycerin, which makes "all the difference in the world" in this case. The combination is a good illustration of what actual aid chemical knowledge is to us in preventing and correcting incompatibilities. If the borax be mixed with the lead acetate, a precipitate will occur, as explained in the previous two prescriptions; but the precipitate dissolves on the addition of the glycerin. If the glycerin be added to a solution of the lead acetate and then mixed with the borax, a precipitate will also form which will redissolve on shaking, provided there be sufficient glycerin present. But if the glycerin be added to the dissolved borax and then mixed with the sugar of lead, no precipitation will take place. What is the cause of this?

To understand this fully, we must examine into the chemistry of borax. Borax is not the normal borate of sodium, of the formula Na_3BO_3. Its formula is $Na_2B_4O_7$, and chemically it is sodium penta-meta-tetra-borate, or it is penta-meta-tetra-boric acid, in which the two hydrogens have been replaced by two atoms of sodium. The word "meta" means change. A meta acid is an acid resulting by the subtraction of the elements of one or more molecules of water from the *regular* or *ortho* acid. For instance, phosphoric acid is H_3PO_4; subtract one H_2O and meta-phosphoric acid—HPO_3—is left. Boric acid is H_3BO_3. Subtract one H_2O, and meta-boric acid is obtained. Now, penta-meta-tetra-boric acid means boric acid, which results by subtracting $5H_2O$ from 4 molecules of boric acid. $4\times H_3BO_3=H_{12}B_4O_{12}$; and $H_{12}B_4O_{12}—H_{10}O_5$ $(=5\times H_2O)=H_2B_4O_7$. Replace the two hydrogens by sodium, and you get the formula of the official borax—$Na_2B_4O_7$. When this borax is mixed with glycerin, it is decomposed into sodium meta-borate and boric acid, and is no longer

alkaline. This rather remarkable reaction can be expressed by the following two equations:

1. $Na_2B_4O_7 + C_3H_5(OH)_3 = 2NaBO_2 + H_3BO_3 + C_3H_5BO_3$
   Sodium Borate — Glycerin — Sodium Metaborate — Boric Acid — Glyceryl borate

2. $C_3H_5BO_3 + 3H_2O = C_3H_5(OH)_3 + H_3BO_3$
   Glyceryl Borate — Water — Glycerin — Boric acid

As is seen, glyceryl borate is one of the intermediate products, but is redecomposed by the water into glycerin and boric acid. As the solution is now acid, lead borate is not formed.

95. Zinci Sulph. ..... grn. xvj
    Sodii Boratis ..... grn. xxx
    Glycerini ..... ℥ ss
    Aquae ..... ad ℥ iv
S.: Use as an injection.

Zinc Sulphate and Borax Yield a Precipitate of Zinc Borate.

But in the presence of glycerin, boric acid is formed, and no precipitate results. (See the remarks on prescription No. 93 and prescription No. 94.)

96. Aconitinae Cryst 0.06
    Atropinae Sulph. 0.12
    Ol. Olivae 8.00
S.: Apply to neuralgic spots.

The alkaloidal salts are not as a rule soluble in the fixed oils, while the uncombined alkaloids are. Atropine should be used instead of its sulphate.

97. Acidi Salicylici ..... ℥ ij
    Aquae Destill. ..... ℥ iv
Fiat Solutio. S.: Apply externally.

That many physicians do not know the solubilities of chemicals is a well-known fact. It is perhaps pardonable. Nevertheless, some prescriptions are simply exasperating to the

druggist. Here the physician expects the pharmacist to accomplish the impossible; to dissolve a substance in 4 fl. ozs. of water, when it would require fully seven and a half pints, or 120 fl. ozs., to effect solution! Salicylic acid is soluble in 460 parts of water; that is, about 1 grn. in 1 oz. As there are 120 grn., it would require 120 fl. ozs. Boiling the water would only make matters worse, because while the salicylic acid would be dissolved temporarily, it would separate out in large needle-shaped crystals as the solution became cold. The physician should be informed of the trouble.

98. Ac. Borici ..... ℥ ij
Aquae Destill. ..... ℥ iv
Fiat Collyrium. S.: Use with eye-dropper.

Only about 70 grn. would dissolve in 4 fl. ozs. of water, and this is all that should be used; i. e., a saturated solution should be dispensed. The physician need not be consulted. The addition of glycerin to increase the solubility of the boric acid is not advisable, in view of the fact that the solution is to be used for the eyes. Glycerin, even when diluted, sometimes proves irritating.

99. Mentholi .....grn. x
Thymoli .....grn. iij
Eucalyptoli .....min. v
Cocainae Hydrochlor. .....grn. x
Petrolati Liquidi ..... ℥ ij
S.: Use with spray night and morning.

This is a very common prescription. The first three ingredients dissolve without any difficulty in the liquid petrolatum, but the cocaine hydrochloride is absolutely insoluble therein. Cocaine alkaloid is soluble, and that should be used.

100. Morphin. Sulph. .....grn. xij
Ac. Oleici ..... ℥ ss
For external use only.

The alkaloidal salts are not soluble in oleic acid; the free alkaloids are. Morphine should be used instead of morphine

sulphate. If morphine is not at hand—and it seldom is in the average drug store—it can easily be prepared as follows: Make an aqueous solution of morphine sulphate, add ammonia water until the precipitate ceases to form, collect the precipitate (which is free morphine) and dry it between filter paper. Dissolve the alkaloid in the oleic acid, using very gentle heat if necessary.

101. Strontii Bromidi 15.0
Divide into powd. No. xxx.

There are 10 chances to 1 that if the above prescription is dispensed as directed, that is, in powder form, the patient will have no powders to take; he will only find wet pieces of paper. Wax paper or parchment paper will not prevent the deliquescence altogether. Strontium bromide is one of the most deliquescent salts we have, and the druggist should refuse to dispense it in powder form. The physician should be informed; he will probably order the prescribed quantity to be dissolved in 120 c. c. of water; the solution to be taken in teaspoonful doses. (Some varieties of strontium bromide are but slightly deliquescent.)

102. Strontii Bromidi ..... ʒ ij
Strontii Iodidi ..... ʒ j
Morphin. Sulph. .....grn. iij
Aquae .....ad ʒ ij

This prescription presents a double incompatibility. Not only is the morphine liable to be precipitated by the bromide and iodide of strontium (as it is by any iodide or bromide) but the sulphate radicle in the morphine will precipitate a part of the strontium as a sulphate.

103. Strontii Bromidi ..... ʒ ij
Potassii Acetatis ..... ʒ j
Lithii Citratis ..... ʒ ij
Tr. Digitalis ..... ʒ ij
Aquae .....ad ʒ ij

This prescription was recently received from a druggist,

who wrote that he made up the mixture in different ways, but each time got an abundant precipitate. He was astonished that a chemical reaction should take place in such an apparently simple prescription, and wanted to know what the reaction was. The reaction is a simple one. The lithium citrate decomposes the strontium bromide, with the formation of strontium citrate (which, being insoluble, precipitates) and lithium bromide.

$$3SrBr_2 + 2Li_3C_6H_5O_7 = Sr_3(C_6H_5O_7)_2 + 6LiBr.$$

STRONTIUM SALTS SHOULD NOT BE PRESCRIBED WITH CITRATES IN SOLUTION.

104. Strontii Bromidi ..... ʒ ij
Natrii Bicarbon ..... ʒ iss
Aquae ..... ℥ iv

The strontium bromide is decomposed and precipitates as a carbonate; but in addition to this, there is quite an active evolution of carbon dioxide, so that if put at once in a bottle the cork may be blown out. The reaction is as follows:

$$SrBr_2 + 2NaHCO_3 = SrCO_3 + 2NaBr + H_2O + CO_2.$$

SOLUBLE STRONTIUM SALTS SHOULD NOT BE PRESCRIBED IN SOLUTION WITH SOLUBLE CARBONATES OR BICARBONATES.

105. Aluminis ..... grn. xl
Plumbi Acetatis ..... grn. xx
Aquae Destill. ..... ℥ iv
S.: Inject two syringefuls 3 times a day.

The official alum is a double sulphate of aluminum and potassium or aluminum and ammonium, and with lead acetate forms lead sulphate, which precipitates. In this case, the prescription being intended as a gonorrheal injection, the precipitate should not be filtered out unless the physician so orders. The reaction which takes place is as follows:

$$\underset{\text{Alum}}{KAl(SO_4)_2} + 2\underset{\text{Lead Acetate}}{Pb(C_2H_3O_2)_2} = \underset{\text{Alum. Acetate}}{Al(C_2H_3O_2)_3} + \underset{\text{Potass. Acetate}}{KC_2H_3O_2} + 2\underset{\text{Lead Sulph.}}{PbSO_4}$$

It may not be out of place to note here that this solution of aluminum acetate is practically the well known "Solutio Burowii" which at one time was very popular on the continent, but later came into disuse; lately aluminum acetate is again coming into extensive use.

106. Aluminis .....grn. v
Plumbi Acetatis .....grn. iij
Aquae Dest. ..... ℥ vj
S.: Three drops into each eye.

In this case, the precipitate should be carefully filtered out, as the insoluble lead sulphate would cause great irritation to the eye.

107. Aluminis ..... ℥ xiv
Plumbi Acetatis ..... ℥ vj
M. ft. pulvis. Detur ad scatulam.
S.: Tablespoonful in a quart of water, as a douche.

When alum and lead acetate are rubbed together in a mortar a soft mass is obtained, due to chemical reaction and the consequent liberation of the very large amount of water of crystallization. This can be prevented by using the proportionate amount of the dried salts, or by mixing the salts lightly, without trituration. But this is not the point I wish to bring out. My contention is that the prescription is a bad one to dispense. The reason may appear a trivial one but it is to be counted with nevertheless. The insoluble lead sulphate clogs up the little holes of the vaginal tube and makes the douching very inconvenient. The doctor should be consulted; perhaps he would agree to use zinc acetate instead. Several instances have come to my notice, where ladies refused to use or complained about the above powder.

The above three prescriptions well illustrate how different directions at the end of the same prescription may differently determine the conduct of the pharmacist in dispensing that prescription.

108. Zinci Sulphatis .....grn. iij
Sodii Boratis .....grn. x
Aquae Rosae ..... ℥ j
M. ft. Collyrium.

A precipitate of zinc borate (and some zinc hydrate) results. The remarks concerning prescription No. 93 apply to this one as well. (See also prescription 95.)

109. Iodi Resublim. ..... ℥ j
Adipis Lanae ..... ℥ j

To put the iodine in a mortar, make an attempt at powdering it, and then rub it up with the woolfat, as I saw a druggist do it, shows the acme of incompetence. When solids are to be incorporated with an ointment base, they should be either in the form of a fine, impalpable powder, or a soft, smooth, homogeneous mass; or, when possible, in solution. It is next to impossible to reduce iodine to an impalpable powder. A little potassium iodide and water should be added, so as to dissolve the iodine (in this case about 15 grains of potassium iodide and ½ to 1 dram of water); then only is it to be gradually incorporated with the woolfat.

110. Potassii Iodidi 8.0
Adipis 60.0
M. ft. ung.

Here again, if the pharmacist is up to the mark, he will first dissolve the potassium iodide in hot water (about 1½ drams), and he will add a little sodium thiosulphate, to prevent the liberation of iodine and the consequent discoloration of the ointment. He will thus avoid the possible bringing back of the salve in a few days with the tale that "it has turned brown and mamma is afraid to use it; wouldn't you please make up another jar?"

111. Ferri Phosphatis ..... ℥ iss
Acidi Phosphor. Dil. ..... ℥ ij
Syr. Simpl. ..... ℥ ss
Aquae .....ad ℥ iij

This prescription has become a standing nuisance to every one who has to do with prescription incompatibilities. It is one of the most frequent prescriptions in my collection, and it can be found in almost any volume of every pharmaceutical journal. The reason of it lies perhaps in the confusion which exists in the average druggist's and physician's minds as to the difference between the true chemical and the official ferric phosphate. The former—$Fe_3(PO_4)_2$—is a whitish powder, very slightly soluble in water but soluble in solutions of the alkaline citrates and in strongly acid solutions. The official phosphate is a combination of ferric phosphate and sodium citrate, and bears the title (in its synonym) "*soluble* ferric phosphate" to distinguish it from the true chemical, *insoluble* phosphate. On adding phosphoric acid, the sodium citrate, which *acts as a solvent* for the iron salt, is decomposed, a little sodium phosphate and citric acid being formed. As those do not act any more as a solvent for the ferric phosphate, the latter precipitates. To leave out the phosphoric acid would be inadmissible, as it is an important medicinal ingredient. If diluted meta-phosphoric acid (HPO_3, also called "glacial" phosphoric acid) be used, no precipitation will occur. For my part, I see no objection to dispensing the above mixture as written, with a shake label.

112. Ferri Phosphatis Solubilis ..... ℥ iss
Acidi Phosphorici ..... ℥ ij
Syr. Simpl. ..... ℥ ss
Aquae Foeniculi .....ad ℥ iij

In this prescription the physician ordered phosphoric acid, concentrated, and not the diluted. No precipitation will take place, because as stated above ferric phosphate is soluble in strongly acid solutions. It may also be noticed here, that if the amount of the acid be very small in proportion to the amount of ferric phosphate used, no precipitate will form, as the acid is either too dilute to decompose the sodium citrate at all, or only a very insignificant proportion of the latter is

decomposed, the balance still being sufficient to act as a solvent. In the pharmaceutical journals where the above prescriptions are criticized, the statement is generally made that soluble ferric phosphate and ortho-phosphoric acid are incompatible; but I never found any reference to the fact that the proportion of phosphoric acid used made quite some difference. To the question: Why is a solution of soluble ferric phosphate of a nice green color, while a solution of ferric phosphate, to which a sufficient quantity of acid has been added to redissolve the formed precipitate, is perfectly colorless? The following explanation may be satisfactory: The soluble ferric phosphate is not a simple mixture, but more or less of a chemical combination of two salts. It is a kind of double-salt and the best name for it, in my opinion, would be "ferri-sodio-phospho-citrate." It is this double-salt that is of a green color. On adding phosphoric acid it is decomposed, ferric phosphate (true), sodium phosphate, and citric acid being formed. None of these compounds possesses a green color.

113. Ext. Hyoscyami ..... ℥ j
Ac. Tannici ..... ℥ ss
Adipis ..... ℥ j

The extract is to be rubbed up with a little diluted alcohol and incorporated with about half an ounce of the lard; the tannic acid is incorporated with the other half, and the two salves mixed. The tannic acid should not be brought in immediate contact and rubbed with the extract, as the alkaloids of the hyoscyamus—hyoscine and hyoscyamine—are thus more likely to become insoluble tannates.

114. Acidi Carbol. ..... min. v
Glycer. Boroglycerini ..... ℥ j
Aquae ..... ℥ ij
S.: Apply to the throat with a cotton swab.

Glycerite of boroglycerin contains a very large amount of boric acid in solution—31 per cent. by weight. It contains

it in the form of a true chemical compound, glyceryl borate or boroglycerin, $C_3H_5BO_3$. This will furnish an answer to the question, so often asked, why the Pharmacopœia did not name this particular glycerite "Glyceritum Ac. Borici," the same as "Glycer. Ac. Carbolici," or "Glycer. Ac. Tannici." In the last two the acids are simply dissolved in the glycerin, while in boroglycerin the boric acid is chemically combined with a portion of the glycerin; and the glycerité is a solution of this chemical compound in glycerin. Now, boroglycerin is decomposed in the presence of water, as shown by the following equation (see also No. 94):

$$C_3H_5BO_3 + 3H_2O = C_3H_5(OH)_3 + H_3BO_3$$

Boro-glycerin — Water — Glycerin — Boric Acid

That is, glycerin and boric acid are reformed.

As boric acid requires 25 parts of water for solution, there is not enough of the latter to keep all dissolved, so that part of the acid precipitates out. The application to the throat would thus lose considerably in effectiveness. If instead of the water we use glycerin, wholly or in part, no precipitation will take place; and this is the method to be pursued in dispensing the prescription. It is well to note that the precipitation will take place only if the boroglyceride is fully up to the standard and has been made up with official glycerin; a weak preparation will show no change when mixed with water.

115. Tr. Nucis Vomicae ..... ℥ iij
Strychninae Sulph. ..... ¾ gr.
Sol. Fowleri ..... ℥ iij
Syr. Ferri Iodidi ..... ℥ vi
Elixir Calisayae .....ad ℥ iij

Those who think that it is useless to worry with prescription incompatibilities would change their minds if they had an opportunity to work in a real pharmacy, say where 100 to 300 prescriptions are made up daily. They would then

be convinced that the subject of prescription incompatibilities is more important—to the druggist—than botany, physics, physiology or toxicology. The above prescription, written by an eminent physician, is a bad one. The Fowler's solution precipitates the strychnine both from the nux vomica and from the sulphate; it also precipitates ferrous carbonate from the syrup; besides, the iron forms an inky mixture with the tannin (cincho-tannic acid) of the calisaya and—to finish up—some ferrous arsenite is likely to be formed. To dispense it as written is absolutely inadmissible. A slight manipulation would improve matters a good deal. Add very carefully some diluted hydrochloric acid just to neutralize the alkalinity of the Fowler's solution, or to make it very faintly acid. This will obviate the precipitation of the strychnine and of the ferrous carbonate. But we must be careful not to add too much acid as otherwise the ferrous iodide may be decomposed, with the liberation of free iodine. Leaving out the Fowler's solution altogether (with the physician's permission) will also obviate most of the difficulties.

116. Ichthyol 8.0
Ac. Hydrochlor. Dil. 12.0
Aquae Amygd. Amar. 10.0
S.: Guttas quindecim ter in die, in paululo aquae, post cibos.

This prescription is absolutely incompatible. A dark resinous precipitate collects on the sides and bottom of the bottle, and the entire mixture becomes worthless; even the bottle has to be thrown away. Ichthyol, without any further specification, is ammonium sulpho-ichthyolate or ichthyol sulphonate. Mineral acids decompose it, the acid radical combining with the ammonium and the sulpho-ichthyolic (or ichthyol-sulphonic) acid precipitating. The physician should be notified of the facts. The direction reads: Fifteen drops three times a day in a little water after meals.

117. Ichthyol ..... ℥ iij
Tr. Nuc. Vom. ..... ℥ ij
Tr. Capsici ..... ℥ iv
Tr. Cannab. Ind. ..... ℥ ij
Tr. Cinch. Comp. .....ad ℥ iij
S.: Teaspoonful before and after the principal meals.

Ichthyol being insoluble in alcohol, a precipitate will gradually form; but as the ichthyol is not decomposed and its virtues are not impaired, the mixture may be dispensed with a "shake" label, and with instructions to keep the bottle on the side. If the bottle is stood up and is not shaken frequently, the ichthyol will collect in a resinous mass at the bottom, which it will be impossible to detach and distribute throughout the bottle.

118. Ichthyol ..... ℥ iss
Hydrargyri Chlor. Corros. ..... gr. viij
Potassi Iodidi ..... ℥ ij
Tr. Cardam. Comp. ..... ℥ ss
Aquae Menthae Pip. .....ad ℥ vj
S.: Teaspoonful 4 times a day. Reduce to half-teaspoon 3 times a day if the stomach gets upset.

Ichthyol being prescribed in such a great variety of disorders, it is no wonder that it is occasionally prescribed in combination with drugs with which it is incompatible.

Recently the above mixture was sent to me by a druggist, asking whether I could not do anything to restore or to improve it; it being quite an expensive prescription, he did not feel like throwing it out, but of course he could not send it out the way it was. No, he could not, indeed! It was a very curious looking mixture. In a brownish transparent liquid there floated numerous pieces that looked like black pitch. Some of the pieces were quite large, so that they could not get out of the bottle. I told him that there was no way of "restoring" the prescription, nor was there any way of making it up properly from the start, except, perhaps, by making an emulsion. But that if he did not feel like

throwing away the mixture, he should break the bottle, filter the mixture, collect the precipitate on the filter, and dispense it in 48 capsules (it was just the right consistency to be divided, without any extraneous addition), and instruct the patient to take for each dose a teaspoonful of the filtered liquid and one capsule; that he should first notify the doctor, however. The physician gave his sanction, and the druggist acted as here suggested. The precipitate was due to the formation of potassic and mercuric ichthyol-sulphonates, which are much less soluble in water than the ammonium ichthyol-sulphonate. Mercuric chloride by itself, in the doses in which it is usually given, may be prescribed with ichthyol, because, in the first place, the precipitate is slow in formation, and, secondly, because it is not of a resinous character (sticking to the walls of the bottle), but may be easily distributed throughout the contents by shaking.

119. Ammon. Sulpho-ichthyol. ..... ℥ ij
Strychninae Sulph. ..... gr. j
Quininae Sulph. ..... gr. xxx
Syr. Rub. Idaei ..... ℥ j
Ol. Caryophyllor. ..... gtt. iv
Aquae ..... ad ℥ iv
S.: ℥ j ter in die, p.c.

This would be a dangerous prescription to dispense. Ichthyol is incompatible with almost all alkaloids, because the ichthyol-sulphonic acid combines with them and precipitates them as difficultly soluble ichthyol-sulphonates. In this case both the strychnine and the quinine would be precipitated in the form of a sticky resinous mass; and it is not hard to imagine the patient getting the whole grain of strychnine at one dose. The prescription should not be dispensed.

120. Ichthyol 6.0
Cocainae Hydrochl. 0.6
Aquae Dest. 200.0
Inject 3 times a day, after urinating.

In order to alleviate the burning sometimes caused by a

3 per cent. ichthyol injection in very acute gonorrheas, the physician orders some cocaine with it. But, alas! the cocaine will do here no good, because, being an alkaloid (see above) it will be precipitated as cocaine sulphoichthyolate. The cocaine should be left out and the physician informed of the facts.

From the Preceding Five Prescriptions It Is Seen That Ichthyol Is Incompatible with (1) Acids, (2) Alcohol, (3) Mercuric Chloride and Potassium Iodide and (4) Alkaloidal Salts.

121. Sol. Fowleri ..... ʒ ij
Hydrargyri Bichloridi ..... gr. iij
Aquae ..... ʒ iij
S.: ʒ i t.i.d., p.c. in water.

This prescription is absolutely incompatible. In the way it is written, it will of course not be dispensed by any one, not even by the merest junior tyro. A variety of reactions will take place, depending upon the relative proportion of the ingredients and upon the order of mixing them. As is well known, Fowler's solution contains free potassium carbonate (potassium bicarbonate is taken; but, as explained in prescription No. 63, any bicarbonate in solution, when heated to boiling, becomes converted into a carbonate); this converts the bichloride into mercuric carbonate, mercuric oxide, and mercuric oxychloride; these mercuric compounds undergo further changes, which end in the separation of a great deal of the mercury in the metallic state. But this is not all. The mercury displaces the potassium in the potassium arsenite, forming mercuric arsenite and possibly also arsenate.

By adding some hydrochloric acid to the Fowler's solution, so as completely to neutralize the potassium carbonate, most of the trouble will be obviated; i. e., there will be no precipitate of mercuric carbonate or oxide, etc.; in fact, the mixture will at first be perfectly clear and transparent, but gradually there forms a slight precipitate (of mercuric arse-

nite?). The prescription may be dispensed with a "shake well" label.

122. Ac. Salicyl. (from Wintergreen)..... ʒ ij
Morphia Sulph. ..... gr. iii
Syr. Aurantii Cortex ..... ʒ i
Aquae q. s. .....ad ʒ iij
Sig. 3 i every three hours.

The above prescription which I reproduce verbatim was received by me from a druggist in Portland, Oregon. The druggist writes as follows: "I received this prescription last evening. I tried hot water, hot glycerin, alcohol, all of which readily dissolved the acid, but in each instance on cooling or adding water or syrup the acid separated and had a consistency not unlike very sour milk. I have referred this prescription to other druggists but have received no information. The physician informed me that he had this compounded at another pharmacist's and secured a clear mixture. I have consulted all of the authorities at hand but none seem to cover the case. I am of the opinion that it may be myself and not the ℞ that is at fault. Kindly inform me."

There is no way of dispensing this prescription as a clear solution. There is no way of dissolving 2 drams of salicylic acid in 3 ozs. of an aqueous menstruum. It is possible that the doctor did get a clear mixture, but you know what that means? It means simply this: The druggist put no salicylic acid in the mixture, or did put in some, shook the bottle and filtered out the excess of acid, which in this case means practically the entire amount.

It is sad but true that some druggists will take liberties with a doctor's prescription, will change or omit ingredients without notifying the doctor, thus subjecting a fellow druggist, who may try to put up the prescription honestly, to innumerable annoyances and to suspicions of incompetence and dishonesty.

123. Liq. Plumbi Subacet. 2.5
Mucil. Acaciae 20.0
Aq. Menthae Pip. .....ad 240.0
S.: Use for gargle.

This prescription is a favorite one with a prominent laryngologist of this city. A druggist who received it not long ago was unable to dispense it on account of incompatibility. He tried to make it up, but obtained a mess, which he could not distribute through the bottle. And so he telephoned to help him out of the difficulty. This prescription well illustrates the fact, that incompatibility often depends upon the relative quantities of the ingredients and upon the order of mixing. Goulard's extract is incompatible with mucilage of acacia (see I, 67), but the above may be made up as an homogeneous, permanent mixture. Add the liquor plumbi to half of the water, the mucilage of acacia to the other half, and mix the two solutions. (The druggist had added the liquor plumbi directly to the mucilage.) The mixture has the appearance of diluted milk.

124. Tr. Ferri Chlor.
Liq. Acidi Arsen. } .....āā ʒ ij
Quinin. Sulph.
Infus. Cinchonae .....q.s. ad ʒ iij

This prescription cannot be called incompatible. The tincture, the solution, and the infusion all contain free acid—the first two hydrochloric, the last sulphuric (aromatic). The quinine is dissolved by the free acids without any difficulty, and neither the iron nor the arsenic will be precipitated. There is a darkening in color, however, due to the action of the cinchotannic acid on the iron; but even that is prevented to a certain extent by the acid.

125. Tr. Ferri Chlor.
Tr. Nuc. Vom. } .....āā 10.0
Tr. Digitalis

Chinin. Sulph. } Natrii Salicyl. }	āā 8.0
Spir. Ammon. Arom.	20.0
Syr. Aurant. Cort. } Aquae }	āā 75.0

This is a prescription calculated to ruffle the equanimity and upset the equilibrium of the most placid of druggists. The different incompatibilities and reactions which are apt to take place in it are as follows: (1) The tincture of digitalis will make a black mixture with the iron, producing ferric tannate; (2) the tincture of nux vomica will do the same thing; (3) syrup of orange peel also contains tannin, and will produce a similar effect; (4) the sodium salicylate reacts with the iron, producing ferric salicylate of a deep violet-blue color; (5) the salicylate reacts with the quinine sulphate, which is dissolved by the tincture of iron, producing the sticky, bulky quinine salicylate; (6) the aromatic spirit of ammonia, containing, as it does, free ammonia and ammonium carbonate, will react with the ferric chloride, producing a magma of ferric hydroxide and carbonate, which latter is soon converted into oxide; (7) the spirit of ammonia also reacts with the quinine sulphate, precipitating the free alkaloid quinine, and is apt also (8) to precipitate strychnine and brucine from the tincture of nux vomica. In one instance that the writer recalls, before an attempt was made to make up the prescription, the physician was consulted; but he said it should be made up as written. The druggist did so; but such an awful looking, sticky, pasty mess was obtained, with some dirty-looking liquor floating above, that of dispensing it there could be no question. It is impossible to make it up with all the ingredients in any presentable manner. One of two ways is open: either to leave out the sodium salicylate, or to leave out both the quinine sulphate and the sodium salicylate, and use quinine salicylate instead. Even with this modification a good deal of judgment is necessary

in order to compound the mixture correctly. The proper procedure is as follows: Add the aromatic spirit of ammonia to the syrup; to this add at once the tincture of ferric chloride—no or hardly any precipitation will take place, as concentrated syrup prevents the precipitation of ferric salts by ammonia. Add now the tincture of nux vomica and digitalis; the mixture turns black, but there is no precipitate worth mentioning. Put the quinine sulphate (or the quinine salicylate, if that has been taken, which course is advisable) in a mortar, and incorporate it well with the mixture gradually added. Finally, add the water; or still better, use about ⅓ or ½ of glycerin and the balance water—precipitation will thereby be more surely prevented. The mixture thus obtained is not of too elegant an appearance, but can be poured easily, does not taste abominably, and is good enough for practical purposes. It is unnecessary to say that it must be dispensed with a "shake well" label; the bottle should also be kept on the side.

126. Diuretin ..... ℥ j
Tr. Ferri Chloridi ..... ℥ ij
Syrupi ..... ℥ j
Aquae, q. s. .....ad ℥ ij

If you know the chemical composition of diuretin, you will have no difficulty in making out the incompatibility. Diuretin is chemically theobromine-sodium and sodium salicylate; of the formula $C_7H_7NaN_4O_2 . NaC_7H_5O_3$. (One atom of hydrogen in the theobromine is replaced by an atom of sodium, and this compound is united to a molecule of sodium salicylate). A deep violet-blue solution results, due to the formation of ferric salicylate. Furthermore, some theobromine is liberated and precipitated by the free acid which is present in the tincture.

127. Diuretin ..... ℥ ij
Aquae ..... ℥ vj

I once ordered this mixture and instead of getting a per-

fectly clear solution as I expected, I got a milk-white mixture similar to chalk mixture. On making an inquiry, I found that genuine diuretin was dispensed, but the bottle (one-third full) had been standing on the shelf for over two years. The druggist had forgotten whether diuretin was soluble or not. I can think of no chemical which is more easily decomposed by exposure to the air than diuretin is. The theobromine becomes dissociated from the sodium salicylate and is no longer soluble in cold water. For this reason diuretin should never be prescribed in powders, as the air will decompose it and render it insoluble.

128. Theobromine-Sodium Salicyl ..... ℥ iv
Spir. Glonoini ..... mxxxij
Spir. Nitrous Ether ..... ℥ iv
Ac. Phosph. Dil. ..... ℥ ij
Syr. Rub. Idaei ..... ℥ ij
Aquae q. s. .....ad ℥ viij
S.: ℥ ss every hour until desired effect has been produced.

This seems to be a prescription for an urgent case of dropsy and suppression of urine. If so, it is a pity that the acid spoils its efficiency and rapidity of action to a certain extent. Theobromine-sodium salicylate is incompatible with acids, the theobromine separating and precipitating out. Besides the phosphoric acid, the citric acid in the syrup of raspberry and the nitrous acid in the spirit of nitrous ether will have the same tendency. Of course, salicylic acid will also be precipitated by the acids.

While some pharmacists would dispense the prescription as written, it would be wrong to do so. The conscientious and advanced pharmacist would leave out the phosphoric acid (and perhaps also the syrup of raspberry, substituting a non-acid syrup); and would inform the physician of the changes made, explaining in detail the reasons which made the changes necessary. I am certain that the physician in most cases would be thankful for the information.

129. Tr. Iodi. ..... ℥ jss
Glycerini ..... ℥ ij
Aquae ..... ℥ iij
A.: For swabbing the throat.

Iodine is soluble in alcohol, but practically insoluble in water. When the tincture is mixed with the glycerin and then with the water, the iodine precipitates. The efficiency of the remedy would then be greatly impaired, if indeed the application of undissolved iodine would not prove very irritating. There is an easy way of preventing the precipitation; by adding a little potassium iodide; in the presence of the latter, iodine is soluble in water (like in Lugol's solution). It occasionally happens, though very seldom, that a tincture of iodine is added to water and no precipitate takes place. This is then due to the presence of hydriodic acid and ethyl iodide (traces) in the tincture, which act as a solvent for the iodine. These products—hydriodic acid, ethyl iodide and similar compounds—only form, if the tincture has been kept for a long time.

Now, all the above refers only to the old tincture which was made without potassium iodide. The tincture of the present U. S. P. does contain KI, and the above prescription is therefore a perfectly compatible one.

130. Iodi Resubl'm 2.0
Glycerini 50.0
M. ft. sol. sec. artem.
S.: gtt. x in aqua t.i.d.

It requires from 50 to 60 parts of glycerin to dissolve one part of iodine; only about half the amount of the prescribed iodine would be dissolved. In order to make it all dissolve and also to prevent its precipitation when added to water, as the physician orders, the addition of potassium iodide is indicated. It is not only permissible, but imperative. About 1 gram or 15 grains should be added.

131. Iodine ..... ℥ ss
Oil Turpentine ..... ℥ vj
Alcohol ..... ℥ x
S.: Pro Equo.

This is a frequent combination, intended, as is seen from the directions, for a horse. Great care must be taken not to add the iodine first to the turpentine, as great heat is evolved and the mixture may take fire or explode; the iodine is thereby volatilized as a violet vapor. The right procedure is to dissolve the iodine in the alcohol, and then mix it with the turpentine oil, very gradually added. The mixture is not homogeneous, but separates in two layers; there is not enough alcohol to dissolve the turpentine, the latter requiring three volumes of alcohol for solution. The upper layer consists of turpentine oil. Dispense with "shake" label.

132. Sodii Sulphitis ..... ʒ vi
Ac. Hydrochl. Dil. ..... ʒ ij-ʒ iv
Tr. Nuc. Vom. ..... ʒ iij
Aquae ..... ad ℥ iv
Teaspoonful after meals.

This prescription is incompatible. Sodium sulphite and a mineral acid should never be prescribed together, and if prescribed the druggist, if he knows enough, should call the doctor's attention to the incompatibility. The bad odor is due to the fact that sulphur dioxide, or sulphurous acid gas, is evolved through the action of the acid on the sulphite. The equation is as follows:

$$Na_2SO_3 + 2HCl = 2NaCl + SO_2 + H_2O.$$

Of course, the peculiar antifermentative action of the sulphite is also lost, because the SO_2 gradually volatilizes, while a portion of it is oxidized to sulphuric acid.

Do Not Prescribe Sulphites, Hyposulphites or Thiosulphates with Mineral Acids.

133. Tr. Ferri Chlor. ..... ℥ ij
Muc. Acaciae
Syr. Simpl. .....āā ʒ iv
Aquae Menthae .....q.s. ad ℥ iij

Who does not know the incompatibility in this prescription? It is mentioned in some text-books; it has been discussed time and again in the pharmaceutical journals, and presumably, every pharmacist should know it; but there are hundreds of pharmacists, and no novices either, who do not know it. Here is how a pharmacist put up the above prescription not so very long ago: He mixed the tincture of iron with the mucilage in a mortar, and to the dense gelatinous mass he added and added hydrochloric acid until the precipitate redissolved; he then mixed the solution with the syrup and the water. What a mess it was! On inquiry I learned that he was taught that way by another pharmacist, who was quite proud of his knowledge as to how to dissolve the precipitate formed by tincture of iron with acacia. That there is a much easier and nicer way which does not necessitate the unjustifiable addition of a lot of hydrochloric acid never seemed to have entered the mind of either teacher or pupil. It shows how lack of interest in one's work will deaden the thinking faculties and take away all desire for experimentation or initiative of any kind. The above prescription can be made up without the least trouble, so as to give a clear, transparent solution, by simply mixing first the tincture with the syrup, the mucilage with the water, and then the two solutions together.

134. Ferri Dialysati Liq.
Syr. Rubi Idaei
Muc. Acaciae .....āā ℥ j
Aquae Anisi ..... ℥ ij

The remarks made in regard to the previous prescription apply to this one as well. That is, mix the solution of the dialysed iron with the syrup, the mucilage of acacia with the water, and then mix the two solutions.

135. Salol ..... ℥ ij
Spir. Aeth. Nitrosi ..... ℥ j
Tr. Ferri. Chloridi ..... ℥ ij
Glycerini ..... ℥ ss
Aquae ..... ℥ v

Salol is, chemically, phenyl salicylate, $C_6H_5C_7H_5O_3$. When added to the spirit of nitrous ether it dissolves; on now adding the tincture of iron a deep violet-blue solution results, due to the formation of ferric salicylate, and partly also to the action of the phenyl radicle on the ferric salt. On adding the glycerin no change is noticed; if anything, the mixture gets still darker. On adding the water, the mixture becomes at once very turbid, and the deep-violet color is changed to a dirty yellowish-white. The turbidity is due to the precipitation of the salol by the water, in which menstruum salol is insoluble. The mixture does not remain permanently the same, but undergoes a notable change on standing; the salol precipitates, sticking to the sides and bottom of the bottle, while the supernatant liquid is perfectly transparent and of a pale-violet color. The prescription should not be dispensed until the prescriber has been made acquainted with the difficulty.

136. Zinci Iodidi ..... gr. xv
Aquae ..... ℥ ij
S.: ℥ j ter in die.

I received this prescription with the request to explain the reason for the precipitation that took place on dissolving the zinc iodide. My correspondent wrote that he at first dissolved the salt in plain water; then, thinking the precipitate might be due to the impurities and the carbon dioxide in the water, he took distilled water and boiled it; but the result was the same; there was a flocculent precipitate, or rather sediment, floating about. This is a frequent occurrence with zinc iodide; in fact, it always take place unless the salt has been made but a short time and has been kept

in a small bottle with a ground-glass stopper. The reason is a simple one: Zinc iodide is not a very stable salt. It easily loses iodine and has a great avidity for oxygen. Therefore, there is but seldom a sample of zinc iodide to be found in the drug-stores that does not contain a small amount of zinc oxide or zinc oxyiodide. The only thing to do is to filter the solution. (If the dispenser wants to be strictly conscientious, it is well to take 2 or 3 grains more than prescribed, so as to make up the loss occasioned by the filtration.)

137. Aquae Amm. Fort.
Collodii .....āā ℥ ij
S.: Apply to warts with camel's-hair brush.

This prescription was handed me with the remark that the mixture became solidified, and with the question if ammonia water was incompatible with collodion. It is not the ammonia gas that is at fault here, but the water. Collodion is a solution of gun-cotton (pyroxylin or di-nitro-cellulose) in a mixture of alcohol and ether, and is precipitated by water. If plain water is used instead of the ammonia water the result is the same. An alcoholic solution of ammonia (like the formerly official "spiritus ammoniae," not "spiritus ammoniae aromaticus") would answer the purpose; but it is so seldom found in the average drug-store, that difficulty is likely to be encountered in having the prescription compounded properly.

138. Collodii ..... ℥ j
Aetheris ..... ℥ ss
Aq. Ammon. Fort. ..... ℥ j
Tr. Iodi ..... ℥ iss

By a strange coincidence, no sooner had I disposed of the previous prescription than I was requested to criticize the above. The druggist had dispensed it without giving it a thought, as at first it looked all right; but there really was very much the matter with it. The reason that no precipita-

tion was noticed at once was due to the extra ether entering into the prescription; but after a while the pyroxylin is precipitated out completely. That is not all, however. The iodine combines with the ammonia to form ammonium iodide and iodate; and it is due to this fact that the odor of the ammonia very quickly disappears (almost completely). There being in this prescription an excess of iodine, the mixture is brown at first, but gradually it becomes lighter, until in a short time it is perfectly colorless. Undoubtedly the excess of the iodine combines with the ether to form ethyl iodide. What is obtained in the end? A little cotton at the bottom of the bottle, with a supernatant solution of ammonium iodide and iodate (in an ethereo-alcoholic medium). The prescription, as written, should not be dispensed, because both the protective value of the collodion and the counter-irritant effect of the iodine are entirely destroyed. If the ammonia water is omitted the prescription is all right in every respect. As the ammonia disappears anyhow (from its combining with the iodine), there can be no objection to that course; but the physician should be informed of the change made.

139. Plumbi Acetatis ..... ʒ i
Glyceriti Ac. Tannici ..... ʒ iij
Aquae ..... ℥ iss

"Is this prescription incompatible and would I have been right in refusing to dispense it?" was a query put to me recently. It should be remembered that the words "incompatible" and "non-dispensable" are not synonymous. A prescription may be incompatible, but as long as it is not dangerously poisonous or explosive, and it can be poured from the bottle (if a mixture), we may dispense it—if the physician so desires. There is, of course, no question as to the incompatibility of the prescription. Insoluble lead tannate is formed, and of course, precipitates. If the proportions are large an almost solid mass is formed. Whether to dispense it as written or to inform the physician depends a great deal

on the directions. If it is to be applied externally, with lint, etc., there can be no objection to its being dispensed—many physicians believe lead tannate to be an excellent remedy in phlegmasia dolens, epididymitis, buboes, etc.; but if the mixture is to be used as a gargle, for instance, I would advise informing the physician.

140. Zinci Chloridi ..... gr. xx
Collodii ..... ʒ iij
S.: Apply to corn with camel's-hair brush.

The druggist, anticipating some difficulty in dissolving the zinc chloride directly in the collodion, dissolved the salt in about half a dram of water and mixed it with the collodion; thus converting it into a useless mass. The right way is to dissolve the chloride in a little—a few drops—alcohol (in which it is very soluble), and then mix the solution with the collodion. I have seen another druggist, wishing to put up an effective corn cure, mix liquor potassii hydroxidi with collodion, and thus spoil 8 ounces of the latter.

141. 3 Tr. Nucis Vom.
4 Tr. Digitalis
1 Tr. Ferri Chloridi
2 Ac. Phosph. Dil. .....āā ʒ ij
5 Aquae ..... ℥ ij

This mixture will present a somewhat different appearance, according to the manner in which the ingredients are mixed. I know of a case where ignorance of this fact cost the druggist a valuable customer. If the ingredients are mixed in the order in which they are written, a somewhat dark and turbid mixture is obtained. The tannin of the first two ingredients produces the tannate of iron, which is in turn decomposed by the phosphoric acid. If the phosphoric is first added to the tincture of iron, a perfectly colorless solution is the result, due to the formation of acid ferric phosphate. On now adding the tinctures, a much lighter and clearer solution is obtained. The druggist, above referred to, forgot the order

in which he mixed the ingredients the first time, and on renewal the mixture had a different color. No amount of argumentation would convince the patient that no mistake had been made. He said he preferred to patronize more careful druggists. In such prescriptions the exact order of mixing should be noted, by the aid of figures, as shown above.

142. Zinci Phosphidi ..... gr. xvi
Ac. Phosphor. Dil. ..... ʒ i
Glycerini ..... ʒ i
Aquae Menthae .....q.s. ad ʒ iv
S.: ʒ j three times a day, after meals.

This prescription recalls to mind an interesting discussion I once had with a physician regarding the doses of medicines. He claimed that the doses of all the medicines, poisonous and non-poisonous, are too small as given in the books. He cited many instances to prove the truth of his assertion, and among other things he said: "Here is zinc phosphide. The dose as given in the books is from 1-16 to ¼ of a grain. Well, I always prescribe it in ½ and 1-grn. doses, and have never seen any bad or even disagreeable effects." This statement astounded me somewhat. I replied that I would never exceed ½ grn., and asked him in what form he prescribed it—in pill or capsule. "In solution," was the answer. "How do you dissolve it?" I asked. "Zinc phosphide is insoluble in water or alcohol." He replied that he never had any trouble, and showed me the above prescription. I could not refrain from smiling, and that gave him a clue that something was wrong with his prescription. I then explained that in the above prescription he had practically no zinc phosphide left; that the acid decomposed it, with the production of phosphine or phosphoretted hydrogen and zinc phosphate, and that he would have done much better to prescribe zinc phosphate from the start. The reaction which takes place may be expressed by the following equation:

$Zn_3P_2 + 2H_3PO_4 = Zn_3(PO_4)_2 + 2H_3P.$

Zinc Phosphide — Phosphoric Acid — Zinc Phosphate — Phosphine.

The regular tribasic zinc orthophosphate is insoluble in water; and as the above mixture was perfectly clear, it is evident that by the aid of the excess of phosphoric acid the zinc acid phosphate was formed.

The reaction would then have to be expressed as follows:

$Zn_3P_2 + 3H_3PO_4 = 3ZnHPO_4 + 2H_3P.$

143. Aloini ..... gr. ij
Podophyllini ..... gr. ss
Calomelanos ..... gr. v
Pulv. Saponis .....q.s.

This forms a strong cholagogue pill. Though the physician directs that soap be taken as the excipient, it is neither advisable nor perhaps even permissible to do it. Soap is practically always alkaline, due to an excess of soda. This latter will convert the calomel into mercurous oxide (Hg_2O); and even assuming that the latter would not gradually decompose into metallic mercury and mercuric oxide, it is certainly dangerous to take internally about 5 grs. of mercurous oxide. Another excipient, such as extract of gentian, should be taken. The black color noticed while triturating the calomel with the soap is due to the above-mentioned conversion of the calomel into the black oxide of mercury.

Calomel and Soap Are Incompatible.

144. Quin. Sulph.
Ac. Tartarici .....āā ʒ iss
Potass. Iodidi ..... ʒ ijss
Syrupi Rub. Idaei ..... ℥ j
Aquae .....q.s. ad ℥ iij

In ℞ No. 40 I presented a similar prescription, but dilute sulphuric acid was used instead of tartaric acid; the presence of the latter produces an additional precipitate, thus making a triple incompatibility. If the quinine sulphate is

dissolved in a part of the water by the aid of the tartaric acid, and a solution of the potassium iodide added to this, a fine crystalline precipitate is immediately formed. This precipitate is not quinine iodide, as might be supposed (that is formed later), but potassium bitartrate.

KI	$+ H_2C_4H_4O_6 =$	HI	$+$	$KHC_4H_4O_6$.
Potass. Iodide	Tartaric Ac.	Hydriodic Acid.		Cream of Tartar.

It will be remembered that this is the official way of making Dilute Hydriodic Acid. The hydriodic acid and the balance of the undecomposed potassium iodide soon afterward attack the quinine sulphate, and precipitate it in the form of quinine hydriodide. In dispensing, the tartaric acid had best be left out.

145. Iodoformi
Hydrarg. Chlor. Mitis } .....āā ʒ ij

This prescription is said by some to be incompatible, it being claimed that iodine is liberated from the iodoform, converting the calomel into mercuric iodide. I take exception to this statement and affirm that this combination is quite compatible. Iodoform liberates iodine only when exposed to direct sunlight; and when such a powder is prescribed, it is not generally set in the sun. It is more often hidden under a bushel. I have prescribed this combination hundreds of times, without ever noticing mercuric iodide. As a rule, the powder is used in a few days.

146. Liq. Plumbi Subacet. ..... ℥ ss
Tr. Opii ..... ʒ ij
Aquae .....q.s. ad ℥ iv

There is certainly not a druggist who has not at some time or another dispensed this prescription. Though strictly incompatible, it is nevertheless dispensed daily; and as it seems to give good results to both physician and patient, we must not object. The incompatibility is a double one; lead being

an alkaloidal precipitant, precipitates the alkaloids of the opium; another portion of it combines with the meconic acid present in the opium tincture and precipitates as lead meconate. In the case where lead acetate is used instead of the subacetate (as it is in the National Formulary—see "Lotio Plumbi et Opii"), the precipitate is not quite so heavy.

147. Hydrarg. Chlor. Mitis ..... gr. iij
Ammon. Carbon. ..... gr. v
Saech. Lactis ..... gr. v
M. et ft. pulv. No. 1. Tal. dos. No. xxiv.

There is no positive proof on hand that a very poisonous compound is formed on mixing the above ingredients; nevertheless it is better to be on the safe side, and not dispense this prescription. When the ammonium carbonate and calomel are rubbed together the color of the powder is changed to black. This black color is due to the formation of mercurous oxide (Hg_2O) and ammonium mercurous chloride (NH_2Hg_2Cl) and, taking into consideration the instability of the mercurous compounds, there can hardly be any doubt that within a short time a portion of them will lose the extra atom of metallic mercury and pass into the mercuric state.

148. Sol. Labarraque
Sol. Hydrogenii Peroxidi .....āā 75.0
S.: Apply to throat and nose with cotton swab.

The activity of Labarraque's solution, or solution of chlorinated soda, depends upon the presence therein of sodium hypochlorite, which is easily decomposed, yielding chlorine. In the presence of the peroxide the hypochlorite becomes reduced, according to the following equation:

$$NaClO + H_2O_2 = NaCl + H_2O + O_2.$$

As is seen, the peroxide becomes reduced to water at the same time. The prescription or a part of it therefore becomes practically worthless.

Hydrogen Dioxide Should Not Be Prescribed with So-

LUTION OF HYPOCHLORITES (LABARRAQUE'S SOLUTION OR JAVELLE WATER).

149. Morphin. Sulph. ..... gr. ij
Antikamnia ..... ℈ ij
Quinin. Sulph. ..... ℈ j
Syr. Tolut. ..... ʒ iij
Ac. Sulph. Arom. .....q.s.
Aquae .....ad ʒ j

Teaspoonful when required.

This prescription forcibly illustrates a tendency which cannot be condemned in too severe terms: the habit which some physicians have of prescribing, in combination with official or other well-known remedies, proprietary compounds, the exact composition of which is not known to them. How can the prescriber be certain that the proprietary article does not react with the other remedies, possibly with a deleterious result to both? How can the druggist be in a position to prevent or correct an incompatibility? How can the physician know to which drug to ascribe beneficial results, following the administration of such a combination? Suppose the patient was relieved by the above mixture; how does the physician know whether the relief was due to the morphine and quinine, or to the antikamnia? I remember one physician used to praise to heaven a certain alterative compound; it was "the anti-syphilitic par excellence." Yet he used to prescribe it invariably in conjunction with the iodides and mercurials. I once asked him whether the therapeutic virtues, he thought the proprietary preparation possessed, might not be ascribed to those drugs; but he still owes me the answer. To return to the above prescription. If the quinine is dissolved by the aid of the acid, and the antikamnia is then added, effervescence takes place, due to the evolution of carbon dioxide. Whether precipitation will take place or not, will depend upon the amount of sulphuric acid. If enough is present to neutralize all the bicarbonate of the antikamnia, none will take place; but if an insufficient quantity is taken,

the bicarbonate precipitates the morphine and the quinine, and the prescription then is a dangerous prescription to dispense. The bulk of the antikamnia, i. e., the acetanilid, will in any case remain undissolved.

150. Hydrarg. Chlor. Mitis ..... ℥ ij
Hydrogenii Peroxidi ..... ℥ ij
S.: Apply externally three times a day.

The statement is generally made that hydrogen dioxide oxidizes or otherwise changes mercurous into mercuric salts. This may be true of soluble mercurous salts, such as mercurous nitrate (I did not investigate that subject, as the *only* mercurous salt used in medicine is an insoluble one), but it must be accepted with great reservation as regards calomel. I shook calomel with hydrogen dioxide for many hours, and failed to detect any mercuric chloride. This assertion must therefore be based upon the following careless observation: When hydrogen dioxide is kept in contact with calomel and filtered, the filtrate will give quite an abundant precipitate with silver nitrate solution; a precipitate soluble in ammonia water and re-precipitated by nitric acid. This shows the presence of a soluble chloride in the filtrate, beyond all doubt. On further investigation we discover that even before being shaken with calomel, the peroxide gives a white precipitate of silver chloride, because the commercial article always contains soluble chlorides. On testing the filtrate with KOH,H_2S, or copper, or any other delicate test for mercury, none is discoverable. It is possible that on very prolonged contact, some bichloride may be formed; but then the decomposition may be due to other causes, such as light, etc. We may safely assert, however, that calomel and hydrogen dioxide are *not* incompatible.

151. Hydrogenii Peroxidi ..... ℥ ij
Sol. Hydrarg. Bichloridi 1:1000. ..... ℥ iv
S.: Apply externally with cotton swab.

This prescription is all right. I have tested this solution

both therapeutically, on patients, and chemically. The antiseptic effect was not in any way diminished, and chemical tests failed to discover any change either in the peroxide or in the corrosive sublimate.

152. Iodoformi ..... ℥ j
Aq. Hydrogenii Perox. ..... ℨ j

The combination is an odd one, but not incompatible. Careful tests failed to discover any decomposition in the iodoform. The insolubility of the iodoform in the menstruum prevents the action of the peroxide on it. If the iodoform is in solution, then peroxide of hydrogen does decompose it, as will be seen from the next prescription.

153. Iodoformi ..... ℥ ss
Aetheris Sulphurici ..... ℨ ss
Aq. Hydrogenii Peroxidi ..... ℨ ij

This prescription is incompatible. The iodoform dissolves in the ether, and on mixing the solution with the peroxide, iodine is liberated, as can be ascertained by adding gelatinized starch, when a deep-blue color is developed. Of course, the red-colored ethereal solution is not miscible with the H_2O_2 solution.

154. Kali Hypermangan. 0.5
Argenti Nitratis 1.5
Aquae Destillatae 25.0

The potassium permanganate dissolves readily in water and so does the silver nitrate; but on mixing the two solutions a precipitate of silver permanganate will form, the latter being soluble only in about 15 parts of water, according to my investigations. Of course, the silver permanganate will not remain long as such, it being soon decomposed into silver oxide, metallic silver, potassium manganate and manganese dioxide (or manganese hydroxide).

155. Sod. Salicyl. ..... ℥ v
Sod. Bicarbon. ..... ℥ iij
Aquae Menth. Pip. ..... ℨ iv

The patient should be told that the medicine will darken after a while, so that there will be no cause for alarm. A solution of commercial sodium salicylate always gets somewhat brownish, and especially does the color develop in the presence of an alkali.

156. Magnes. Sulph. ..... ℥ ijss
Spts. Menth. Pip. ..... ℥ iss
Aquae ..... ℥ iij
S.: Two teaspoonfuls every 4 hours.

There is just about enough water in this prescription to dissolve the magnesium sulphate. It will be a fully saturated solution. But on adding the spirit of peppermint, the entire mixture becomes, so to say, solid, the magnesium sulphate being thrown out of solution. Does any chemical reaction take place? None at all. It is a purely physical process. The $MgSO_4$ is insoluble in alcohol; the latter, besides, possesses strong hygroscopic properties, and abstracts the water from the salt. This salt, having no solvent in which to keep dissolved, precipitates out.

A Saturated Solution of Magnesium Sulphate Should Not Be Prescribed with Alcoholic Liquids.

157. Hydrarg. Chlor. Mit. ..... gr. ij
Antipyrine ..... 3 ss
Sod. Bicarb. ..... 3 ij
M. et ft. pulv. No. xij. S.: One every hour.

In one of the early prescriptions (No. 37) it was stated that when calomel is triturated with antipyrine, some corrosive sublimate is formed. The following reaction is supposed to take place:

$$6Hg\,Cl + 2C_{11}H_{12}N_2O + H_2O = Hg_2O +$$

Calomel Antipyrine Water Mercurous oxide

$$2\,HgCl_2 + Hg_2 + 2C_{11}H_{12}N_2O.HCl.$$

Mercuric Chloride Metallic Mercury Antipyrine hydrochloride

Pains were taken to explain that, as but a small proportion of the calomel (one-tenth or less) is converted into corrosive sublimate, little hesitation need be felt in dispensing calomel and antipyrine, when the former is prescribed in small doses, as fractional parts of a grain. The above prescription may be dispensed with safety, as the prescribed dose of the calomel is but 1-6 grain, and the sublimate that will form will not exceed 1-60 or 1-100 grain.

As to the incompatibility between the calomel and the sodium bicarbonate, the author considers it imaginary. At any rate, for practical purposes, it may be disregarded altogether, as even some of those who claim that the two chemicals are incompatible, say that it takes from six to eight weeks before any corrosive sublimate is formed. Far from considering them incompatible, I together with the entire medical profession, consider calomel and sodium bicarbonate a very eligible combination. When calomel is prescribed in large doses, the tendency to griping seems to be distinctly obviated by the addition of a little sodium bicarbonate.

158. Morph. Hydrochl. ..... gr. ij
Potass. Cyanidi ..... gr. ij
Syr. Ipecac ..... ʒ ij
Vin. Antimonii ..... ʒ ij
Syr. Tolutani ..... ℥ ss
Aquae .....q.s. ad ℥ ij
S.: ʒ j q. 4 h.

This mixture, which was dispensed without a shake label, caused quite alarming symptoms towards the end. The symptoms were those of an overdose of morphine, combined with those of an excess of cyanide. The potassium cyanide reacts with the morphine salt, precipitating it as morphine cyanide; and a small portion may be precipitated as free morphine by the potassium carbonate, which is usually present in potassium cyanide. It is best not to dispense this mixture. If it is, a shake label should accompany it invariably.

159. Mercauro ..... ℥ j
Strychn. Nitratis ..... gr. iij
Atropinae Sulphatis ..... gr. ij
S.: Ten drops in water, four times a day.

This very potent prescription, which again illustrates the reprehensible desire of some physicians to get half a dozen physiologic effects out of the same bottle, was presented to a druggist a few days ago. He knew enough to refuse to dispense it as written and to inform the prescriber that it would make a dangerous combination. The bromides of gold and mercury present in mercauro will precipitate the alkaloids.

160. Ferri et Quin. Citr. Solub. ..... ʒ ij
Liq. Ammon. Acetatis..... ℥ ij
Syrupi ..... ℥ ss
Aquae ..... ℥ iv

On dissolving the iron and quinine citrate in the water and adding the solution of ammonium acetate, a white precipitate is noticed. The precipitate is not due to the iron in this case, as ferric acetate is very soluble, and ferric citrate is not precipitated by ammonia water. The precipitate which gradually forms is quinine acetate. If the solution of ammonium acetate be strongly alkaline, i. e., if it contain an excess of ammonium carbonate, a portion of the quinine citrate will be precipitated as alkaloidal quinine. At best it is a very inelegant combination.

161. Salis Seignetti ..... ℥ iss
Tr. Ferri Sesquichlor ..... ʒ iij
Spiritus Nitr. Dulc. ..... ℥ j
Syrupi Tolutani ..... ℥ ij
Aquae Fontanae ..... ℥ v
M.D.S.: Cochlear magnum ter in die post cibum.

This is the prescription of an old physician, which I made up a number of times. Sal Seignette is another name for Rochelle salt. (Seignette was an apothecary in Rochelle who

first introduced this double tartrate of potassium and sodium.) On dissolving the Rochelle salt in the water and mixing with the other ingredients the mixture becomes turbid, and within a few seconds a heavy crystalline precipitate forms. The solution of the problem is very simple. The tincture of iron contains a considerable amount of free hydrochloric acid. This acid (and also the nitrous acid usually found in spirit of nitrous ether) decomposes the Rochelle salt, with the formation of sodium chloride and cream of tartar, which latter precipitates. The reaction may be shown as follows:

$$KNaC_4H_4O_6 + HCl = NaCl + KHC_4H_4O_6.$$

The alcohol in the iron tincture and the spirit aid in the precipitation, as potassium bitartrate is almost absolutely insoluble in alcohol. The iron has nothing to do with the reaction. It is true that a solution of ferric chloride also decomposes Rochelle salt, but not because it is iron, but because it is strongly acid (containing some free HCl).

162. Aquae Hydrog. Peroxidi ..... ℥ iv
Glycerini ..... ℥ ij
Ac. Hydrochlor. Dil. ..... ʒ i
S.: ʒ ij after each meal.

A druggist refused to dispense the above prescription because he read somewhere that peroxide of hydrogen and glycerin were incompatible. In fact such a statement has been made a number of times in pharmaceutical journals. The statement is false. Hydrogen dioxide and glycerin are perfectly compatible in any proportions, and the mixture does not deteriorate even after standing for months.

163. Hydrogenii Perox. 10.0
Ac. Chromici 1.0
S.: Caustic. For doctor's use only.

The doctor could just as well have allowed this "caustic" into the patient's hands, as it was no longer caustic and

was powerless for harm or for good. This prescription illustrates beautifully the remarkable property of hydrogen peroxide to exercise first its oxidizing, then its reducing power on the same substance. On mixing the above substances a blue color is at once formed, due to the oxidation of the chromic acid (chromic trioxide) into perchromic acid (chromic pentoxide), but soon the blue color disappears, and a brownish amorphous powder precipitates. This precipitate is chromium sesquioxide, formed by the reduction of the perchromic acid. The following two reactions make the changes plain:

$$CrO_3 + 2H_2O_2 = CrO_5 + 2H_2O_2$$

Chromic Acid — Hydrogen Diox. — Perchromic Acid — Water

$$CrO_5 + 3H_2O_2 = CR_2O_3 + 3H_2O + 5O_2$$

Perchromic Acid — Chrom. Sesquiox. — Water — Oxygen

This evolution of oxygen is quite abundant, as can be demonstrated by applying a glowing match to the mouth of the bottle or test-tube.

164. Hydrarg. Bichlor. Corr. ..... gr. iij
Sodii Boratis ..... ʒ iss
Aquae Destill. .....q.s. ad ʒ iij

In one week the writer received two prescriptions like the above; they both came from Brooklyn pharmacists, and originated from the same physician. On dissolving the salts and mixing the solutions, a brownish-red precipitate forms, consisting of mercury oxychloride, with probably some mercury borate. There is no mercury left in the supernatant liquid, as is shown by applying the various tests for mercury. How can this precipitation be prevented? We studied the properties of borax and its behavior with glycerin in previous prescriptions. We know that glycerin decomposes borax into boric acid and sodium metaborate. On adding some glycerin to the solution of the borax and then adding the corrosive sublimate, no red precipitate will be formed. In fact, it

might seem at first that with this modification the prescription is all right. But it is not. After a short while a slight whitish precipitate will be found throughout the liquid and at the bottom of the vessel. Whether this is mercury metaborate, or whether it is due to the impurities present in commercial borax, has not been determined; the prescription should not be dispensed. The only way out of the difficulty is to substitute boric acid for borax; on mixing $HgCl_2$ with a solution of boric acid, a perfectly clear solution is obtained, and one that remains so indefinitely.

165. Sacchari Saturni ..... gr. vj
Kali Hydriodici ..... gr. viij
Syr. Violarum ..... ℥ iv
Aquae Fontanae ..... ℥ j

The first ingredient is sugar of lead, or lead acetate; the second, potassium iodide; the third, syrup of violets (a syrup well known in Europe and prepared from the fresh flowers of viola odorata, our "sweet-blue" violet); and the fourth, spring water. It does not require much knowledge of chemistry to be aware of the fact that the first two ingredients are incompatible. Lead iodide precipitates. The reaction is as follows:

$$Pb(C_2H_3O_2)_2 + 2KI = PbI_2 + 2KC_2H_3O_2.$$

When the potassium iodide is greatly in excess over the lead acetate, the precipitate will redissolve, as lead iodide is soluble in a concentrated solution of potassium iodide forming a double iodide of potassium and lead.

166. Iodoformi ..... ℥ j
Ol. Olivae ..... ℥ ij
Aquae H_2O_2 ..... ℥ ij
Pulv. Acaciae ..... q.s.

This prescription is incompatible. The iodoform being dissolved in the oil, the peroxide reacts on it with the evolution of iodine. Impurities in the fixed oil will also sometimes

cause the liberation of the iodine. (See also prescriptions 152 and 153.)

167. Zinci Sulphatis ..... gr. xviij
Bism. Subnitr. ..... ℥ ss
Aq. Hydrogenii Dioxidi ..... ℥ iij
Aquae ..... ℥ iij

I have tested the action of $ZnSO_4$ and $BiONO_3$ on the hydrogen dioxide, separately and in combination, but found no decomposition; consequently, this prescription may be considered compatible.

168. Liq. Hydrogenii Peroxidi ..... ʒ vj
Bals. Peruviani ..... ʒ ij
S.: Apply with camel's-hair brush.

At first no deterioration in the strength of the peroxide could be detected. On repeatedly shaking it, as is always necessary before applying it, the peroxide will become weaker, but then H_2O_2, even if shaken by itself, without any foreign substance, will become partially decomposed into water and oxygen. But the pharmacist has no reason for not dispensing the above prescription.

169. Liq. Hydrogenii Dioxidi
Tr. Arnicae
Ext. Calendulae Fld. } .....āā ʒ ij

This prescription was presented to me for analysis. After the mixture stood for some days I tested it for the peroxide by applying some to a pus cavity, and by the potassium chromate and ether test, and found no appreciable diminution in strength.

170. Cupri Sulphatis ..... ʒ j
Sodii Bicarbon. ..... ʒ j
Aquae ..... ℥ ij
S.: Apply with brush to ulcerated surface.

This prescription is absolutely incompatible, and the druggist would do the physician a kindness by leaving out the

sodium bicarbonate. It is seen at once that what the physician wants is, to use the copper sulphate as a caustic application. By adding the sodium bicarbonate he completely destroys the caustic effect, as the copper is precipitated as copper carbonate, which is insoluble and non-caustic. By mixing the ingredients and at once corking the bottle, there is also danger of explosion, as a considerable amount of CO_2 is evolved. The following equation will show what reaction takes place:

$$CuSO_4 + 2NaHCO_3 = CuCO_3 + Na_2SO_4 + CO_2 + H_2O.$$

The right course to pursue is to inform the physician and get his consent to omit the sodium bicarbonate.

COPPER SULPHATE IS INCOMPATIBLE WITH SODIUM BICARBONATE.

171.	Tr. Ferri Chlor.	℥ ij
	Morph. Sulph.	gr. iij
	Glycerini	℥ ss
	Aquae	q.s. ad ℥ iij

This is a well-known incompatibility. Morphine with ferric salts strikes a bluish-green color; in fact, this is a test for morphine. The formation of the color is prevented by the presence of free acid, but it is rare that tincture of iron contains so much free acid as to prevent the reaction. In this case it is best to inform the physician of the facts, and let him act as he sees fit.

MORPHINE IS INCOMPATIBLE WITH FERRIC SALTS.

172.	Hydrarg. Iodidi. Flavi	gr. xxiv
	Potass. Iodidi.	℥ iij
	Syr. Sarsapar. Comp.	℥ ij
	Aquae	℥ j

S.: ℥ j 4 times a day.

This is an incompatible and extremely dangerous prescription; the more dangerous because if the syrup of sarsaparilla be added at once the druggist may notice no change in the

physical appearance and dispense it without hesitation. Mercurous iodide, in the presence of potassium iodide or any soluble iodide, becomes at once decomposed into mercuric iodide and metallic mercury. For practical purposes it is sufficiently accurate to remember that one part of mercurous iodide will form about two-thirds of one part of mercuric iodide. The equation and the calculation are as follows:

$$2HgI = Hg + HgI_2$$
$$654 = 200 + 454$$

That is to say, 654 parts, when decomposed, will form 454 parts of mercuric iodide; reduce those figures (it cannot be done exactly) and two-thirds will be the approximate answer. In the above prescription there is 1 grain per dose of the mercurous iodide; this would give ⅔ grain of mercuric iodide per dose, which dose might produce distinctly toxic effects, especially if repeated four times a day. There is also in that prescription about 8 grains of finely divided metallic mercury, but no danger need be apprehended from this source, as metallic mercury may be taken in quite large doses. The pharmacist should refuse to dispense this prescription and communicate with the physician.

MERCUROUS IODIDE FORMS A DANGEROUS INCOMPATIBILITY WITH POTASSIUM IODIDE, OR ANY OTHER SOLUBLE IODIDE.

173. Hydrarg. Iodidi Flavi 0.01
Potass. Iodidi 0.075
M. et ft. pil. No. 1. D. Tal. Dos. No. xxiv.
S.: One pill three times a day.

This and the previous prescription will illustrate what the author has been trying to impress many times, namely, that "incompatible" and "non-dispensable" are not synonymous terms. A druggist received the above prescription, and knowing that the two ingredients were incompatible, he sent to the physician, stating the fact. The latter said he wanted to have the prescription put up just as written. The druggist still hesitated, basing himself on the statement

of the U. S. Dispensatory, which says: "It (yellow mercurous iodide) should never be given at the same time with potassium iodide, which converts it immediately into mercuric iodide and metallic mercury." He consulted me as "final authority," and I advised him to dispense the prescription. The chief difference between the two prescriptions is in the dose. This one contains only 1-6 grain of mercurous iodide, which, even assuming that it becomes entirely decomposed, will yield only 1-9 grain of mercuric iodide, and that is a perfectly safe dose. Thus, the question "to dispense or not dispense," frequently turns on the size of the dose. Another difference between this and the preceding prescription is that many druggists will in this case use the dry potassium iodide, mix it with some inert powder, as althea or licorice, and then make a pill mass with some mucilage of acacia or glycerite of starch. In this condition only a portion of the mercurous iodide will be decomposed.

174. Spts. Ammon. Arom.
Syr. Gallae ..... āā ℥ i
Aquae Cinnamomi ..... ℥ ij

This combination forms an unsightly precipitate, due to the combination of the tannic and gallic acids in the nutgall syrup with the ammonium carbonate in the spirit. Syrupus gallae, or syrupus gallae aromaticus, was a great favorite with the physicians of two generations ago, and a very powerful and effective syrup it was. Now it is almost completely forgotten, but is still occasionally prescribed by those who cling to the old traditions.

175. Hydrarg. Chlor. Mitis ..... gr. xvj
Amm. Chloridi ..... gr. xij
Sacch. Lactis ..... gr. xx
Div. into pulv. No. iv.

The result in this prescription will depend a good deal on the quality of the ammonium chloride. If a salt answering the Pharmacopeial requirements be used, there need be no

fear of any incompatibility. The writer believes that no mercuric chloride is formed. If any is formed, it is so infinitesimal in amount as to be disregardable altogether. But if the commercial impure muriate be used, the prescription may be considered incompatible. In several triturations which the writer made he could discover decomposition after several hours; the powders contained mercurous oxide, metallic mercury, mercuric chloride, and probably also dimercur-ammonium chloride. In some cases the powder became of a grayish color after two minutes' trituration.

176. Hydrarg. Chlor. Mit. ..... 3 j
Ammon. Carbon. ..... 3 j
Saech. Albi ..... 3 ss
Div. into pulv. No. xij.

This prescription is positively incompatible. When ammonium carbonate is rubbed with calomel, a gray color develops at once. This is due to the formation of the black ammonium-mercurous chloride, or dimercur-ammonium chloride, NH_2Hg_2Cl. This compound may not be actively poisonous, but the chemical composition of the calomel and the external appearance of the powder are so changed that the prescription should under no circumstances be dispensed. The ammonium carbonate is to be left out. The writer vividly remembers when he received this prescription the first time and made it up. It was in the good old junior days, when every day brought some new facts, some new knowledge, some new discovery. When he saw the powder turning black he called the employer's attention to it. The latter, a European Master of Pharmacy (Magister Pharmaciae), explained that those two drugs were incompatible and recommended to leave out the ammonium salt, which he did, and notified the physician to that effect. The next morning brought a reply from that physician full of thanks and apologies.

Calomel Is Positively Incompatible with Ammonium Carbonate.

177. Hydrarg. Chlor. Mit. ..... 3 j
Ac. Hydrochlor. Dil. ..... 3 ss
Syr. Rhei Arom. ..... ℥ ss
Aquae .....ad ℥ ij

A physician who will prescribe a heavy powder like calomel in a shake mixture is a very poor prescriber. Perhaps he is not aware of the fact that calomel is insoluble. In this prescription the patient may get in one dose anywhere from 2 to 10 grains of calomel, and the physician can certainly not expect uniform or satisfactory results. This is the only thing wrong with this prescription. The fear of there being formed corrosive sublimate from the action of the hydrochloric acid on the calomel is groundless. The writer failed to discover any with the most delicate tests.

CALOMEL IS *NOT* INCOMPATIBLE WITH HYDROCHLORIC ACID.

178. Hydrarg. Chlor. Mit. ..... 3 ij
Syr. Rhei, Aquae } .....āā ℥ jss
S.: 3 i twice a week on going to bed.

This prescription is incompatible, though it may not appear so at first glance. Syrup of rhubarb contains potassium carbonate; the latter will convert a portion of the calomel into black mercurous oxide, and gradually there may form some mercuric oxide and metallic mercury.

179. Tr. Ferri Chlor.
Potass. Brom.
Sodii Brom. .....āā 10.0
Glycerini 15.0
Aquae .....q.s. ad 60.0

The bromides, like the iodides, are incompatible with ferric chloride. The latter decomposes them with the liberation of bromine or iodine, as the case may be. The equation is as follows:

$$2KBr + 2FeCl_3 = 2KCl + 2FeCl_2 + Br_2$$

As is seen, the ferric chloride is converted into ferrous chloride.

As free bromine is irritating to the stomach, the prescription should hardly be dispensed without informing the physician of the facts.

180. Camphorae Monobrom. ..... gr. iij
Chlorali Hydrati ..... gr. v
Lupulini ..... gr. ij
M. et ft. caps. No. 1.

When monobromated camphor and hydrated chloral are triturated together, a soft moist mass is formed, which on further trituration becomes semi-liquid or liquid. Nevertheless, the prescription may be dispensed, as follows: Rub the monobromated camphor with some absorbent powder, such as starch or althea; do the same thing with the chloral and lupulin; then mix the two powders gently with a spatula, without trituration, and fill into capsules. Should the capsules come out too large, double the number may be filled, and the patient ordered to take two capsules instead of one. The capsules should be kept in a cool and dry place.

181. Magnes. Calcinatae ..... ℥ ij
Pancreatini ..... ℥ ij
Bism. Subnitratis ..... ℥ iss
M. ft. pulvis. Detur at scatulam.
S.: Take as much as can be placed on a twenty-five cent piece 3 times a day after meals.

Druggists rarely affix a "shake well" label to boxes containing bulk powders. Nevertheless, it is occasionally as necessary as with some liquid mixtures. We are apt to forget that powders possess different specific gravities, and if such powders be mixed and not shaken frequently they will separate and form different layers, almost in the same manner as two or more immiscible liquids of different specific gravities do. The writer has made experiments on the subject, and found that if the powders be of different colors the different layers can be beautifully demonstrated. In this pre-

scription almost the entire bismuth subnitrate will be found on the bottom, while the magnesia will be on top. The only way to obviate the difficulty is to direct the patient to shake the box well before taking the powder. This method of prescribing, while very common with German physicians, is not to be commended. Its only recommendation is cheapness.

182. Liq. Hydrogenii Dioxidi ..... ℥ j
Acidi Carbol. ..... gr. xv
Tr. Ferri Chlor. ..... ♏ ij
Glycerini ..... ℥ i
Aquae .....q.s. ad ℥ iv
S.: ♏ j four times a day in a little water.

This is one of the best possible specimens of incompatibility. On mixing the first three ingredients a violent reaction takes place at once; intense heat is generated, a very strong empyreumatic odor becomes noticeable, and the mixture froths and turns perfectly black. Of course, nobody would dispense such a mixture. The exact reaction is too complicated to be given here; one thing may be stated; the carbolic acid reaches the highest point of oxidation, and may be said to be completely "burned up."

183. Potass. Permang. ..... 3 ss
Acidi Carbolici ..... ℥ ss
Aquae ..... ℥ iv

This is another example of the desire to get too much, but of getting nothing instead. Both ingredients are antiseptics, but react upon each other with the following result: The potassium permanganate becomes reduced, while the phenol is oxidized to oxalic acid and carbon dioxide. The following equation shows the reaction:

$$C_6H_5OH + 12KMnO_4 = 2H_2C_2O_4 +$$

Phenol — Potass. Permang. — Oxalic Ac.

$$2CO_2 + H_2O + 6K_2MnO_4 + 6MnO_2$$

Carbon Dioxide. — Water — Potass. Manganate — Manganese Dioxide

No pharmacist will think of dispensing this mixture, as it is too nasty-looking; if the quantity of potassium permanganate is larger, a solid or semi-solid mass is obtained on account of the manganese dioxide which precipitates. (In this prescription the quantity of phenol is excessive; not more than 2 drams will dissolve in 4 fl. ozs. of water.)

184. Potass. Permang. ..... 3 ss
Ac. Salicylici ..... 3 j
Aquae ..... O j
S.: Dip a cloth and apply to ulcer, changing every half hour.

A black mixture is obtained at once. The potassium permanganate becomes reduced to potassium manganate and manganese dioxide; while the salicylic acid is decomposed into formic acid and carbon dioxide. The reaction may be expressed as follows:

$$HC_7H_5O_3 + 10KMnO_4 + H_2O = 4HCHO_2 +$$
Salicyl. Acid — Potass. Permang. — Water — Formic Acid

$$3CO_2 + 5K_2MnO_4 + 5MnO_2$$
Carbon Dioxide — Potass. Manganate — Mangan. Dioxide.

It should be understood that all statements concerning reactions in which potassium permanganate is one of the factors are only relatively correct; because the reaction depends to a great extent upon the quantity of the permanganate present, the concentration of the solution, the temperature employed, etc. For instance, there can be no doubt that if sufficient permanganate be present, even the formic acid will undergo further oxidation until it is split up into carbon dioxide and water; thus: $HCHO_2 + O = CO_2 + H_2O$.

The patient who had an ulcer of many years' standing said that he had derived more benefit from this mixture than from anything he had ever used. His ulcer was eventually healed. Was it time for it to get healed, was it the formic acid, was it the balance of the undecomposed salicylic acid—who will say?

185. Codeinae ..... gr. iv
Ammon. Chlor. ..... ʒ j
Syr. Ipecac. ..... ʒ ij
Syr. Tolu ..... ʒ i
Aquae .....q.s. ad ʒ ij
S.: Teaspoonful every 3 hours.

This prescription cannot be considered incompatible. It is true that codeine, having a strong alkaline reaction, liberates some ammonia gas from the ammonium chloride (the same as potassium or sodium hydroxide does), but the quantity is so small that it may be disregarded. It is best not to bring the codeine and the ammonium chloride together at once, but to dissolve each separately and then mix the solutions.

186. Ol. Tiglii ..... min. viij
Ol. Ricini ..... ʒ i
Glycerini ..... ʒ iij
S.: Teaspoonful every hour until bowels have operated freely.

Physicians and many druggists regard glycerin in the nature of a fat or fixed oil, and think that both fixed and volatile oils are freely miscible with it. They are quite surprised when they find out that the contrary is the case. The people attending the patient must be directed to shake the bottle very thoroughly each time before administering the medicine. Otherwise the mixture of the two oils will be on top of the glycerin, and the patient may get all or half of the croton oil at one dose. The dose of the croton oil—2 drops every half hour—seems rather large, but as it was for a case of lead colic, where a quick operation was absolutely necessary, it was probably all right.

187. Ac. Salicylici ..... ʒ ss
Aquae Calcis ..... ℥ viij
S.: Apply externally.

Glancing casually at the prescription we might think that the greater part of the salicylic acid will remain undissolved;

the solubility of salicylic acid in water being 1 in 460, only about 1 grain dissolves in one ounce of water, and it would require about 28 ounces of water to dissolve the entire quantity of salicylic acid prescribed. But in this case we get a perfectly clear solution, the reason being that a chemical reaction takes place, the salicylic acid combining with the calcium hydroxide to form calcium salicylate. Of course the lime water must contain some *lime*. Some samples which we had occasion to analyze were found to be absolutely free from lime.

188. Ac. Salicylici ..... gr. x
Hydrarg. Chlor. Mitis ..... gr. x
Liq. Calcis ..... ℥ ij
S.: Apply externally as directed.

This prescription has caused considerable trouble in one drug-store. The first time the proprietor made it up, and he dispensed it as a mixture with a white sediment; on being renewed, the clerk dispensed it, and it was a black mixture. The patient brought it back and a lot of explanations had to follow. The first time it was made up by adding the salicylic acid to the lime water; that neutralized the calcium hydrate, forming calcium salicylate [$Ca(OH)_2 + 2HC_7H_5O_3 = Ca(C_7H_5O_3)_2 + 2H_2O$]; on then adding the calomel, no further reaction took place, and the result was a white mixture. The second time the calomel was added directly to the lime water; that produced the black oxide of mercury [$Ca(OH)_2 + 2HgCl = Hg_2O + CaCl_2 + H_2O$], which remained unchanged on the subsequent addition of salicylic acid.

189. Tr. Nuc. Vom. ..... ℥ iss
Tr. Ferri Chlor. ..... ℥ iv
Potassii Hypophosph. ..... ℥ ii
Sodii Hypophosph.
Calcii Hypophosph. } ..... āā ℥ iij

Essence Peps. (Fairchild) ..... ℥ j
Elixir Peptenzyme ..... ℥ j
Glycerini ..... ℥ ss
Aquae .....q.s. ad ℥ vj
S.: 3 i ter in die, post cibum.

The correspondent sending this prescription asked what the matter with it was, and whether it should have been dispensed as written. This is a very nice prescription, theoretically. The doctor seeks to combine the tonic effect of nux vomica, the hematinic actions of the iron, the "neuro-nutrient" effects of the three hypophosphites, and the digestive effects of pepsin and peptenzyme. But the mixture cannot be dispensed; not in a presentable form, at any rate. The trouble is between the hypophosphites and the ferric chlorides; the insoluble ferric hypophosphite forms at once and precipitates. If the solutions are concentrated enough, a gelatinous, almost solid mass is produced.

Can this precipitation be prevented? Well, by using a sufficient amount of hypophosphorous acid or potassium (or sodium) citrate, it can; but this prescription already contains so many ingredients that it is hardly justifiable to add any more. The tincture of iron might be left out altogether. However, there is a better way, which will certainly appeal to the physician; and that is to substitute another ferric compound for the ferric chloride. The most eligible salt in this case is the ammonio-ferric citrate (Ferri et Ammonii citras, U. S. P.). No precipitation takes place between this ferric salt and the hypophosphites. As to the amount of ammonio-ferric citrate which corresponds to the quantity of tincture ordered, a slight calculation will give the result. Tincture of iron contains an amount of $FeCl_3$, corresponding to 4.7 per cent. of metallic iron; the citrate of iron contains 16 per cent. of Fe. Seventy-one grains of the latter will, therefore, be the equivalent in metallic iron of half an ounce of the former.

190. Tr. Ferri Chlor. ..... ℥ vi
Syr. Hypophosphitum .....ad ℥ iij
S.: ℥ i t.i.d.

An almost solid mass results, or a thick liquid with an unsightly precipitate. The cause is the same as in the previous prescription; the formation of ferric hypophosphite, $Fe(PH_2O_2)_3$. Potassium citrate dissolved in the smallest amount of water possible, or simply dissolved in the syrup, should be used to prevent the formation of the precipitate or to dissolve it after it has formed. A perfectly clear solution of a greenish color is the result.

191. Tr. Ferri Chlor. ..... ℥ ii
Syr. Hypophosphitum ..... ℥ j
Aquae .....ad ℥ ij

If the tincture is first mixed with the water and the syrup then added, no precipitation will take place. Should the first two ingredients have been mixed with the formation of a precipitate, the water will redissolve it. Ferric hypophosphite is slightly soluble in water, especially in the presence of hypophosphorous acid, a trace of which is present in the syrup.

192. Tr. Iodi ..... ℥ i
Liq. Hydrogenii Dioxidi ..... ℥ ij
S.: For external use.

This prescription is incompatible and should not be dispensed.

In the above there soon commences quite an active reaction between the iodine and the peroxide; the iodine is converted into hypo-iodous acid, according to the following reaction:

$$2I + H_2O_2 = 2HIO.$$

This, as will be seen, is similar to the reaction which takes place on mixing chlorine water with solution of hydrogen peroxide. But here the similarity ceases. While the hypochlorous acid on coming into contact with another molecule of

H_2O_2 becomes reduced to hydrochloric acid (with liberation of oxygen: $HClO + H_2O_2 = HCl + H_2O + O_2$) the opposite reaction takes place with the hypo-iodous acid; instead of becoming reduced to hydriodic acid, it becomes oxidized to iodic acid. Reaction as follows:

$$HIO + 2H_2O_2 = HIO_3 + 2H_2O.$$

The writer has established these facts beyond doubt; careful chemical analysis proved the absence of hydriodic acid, while showing the presence of iodic acid in abundance.

193. Potass. Permang. ..... 3 ss
Ferri Sulphatis ..... 3 j
Ac. Sulph. Dil. ..... 3 ij
Magnes. Sulphat. ..... ℥ ij
Syr. Zingiberis ..... ℥ ij
Aquae .....q.s. ad ℥ viij

This combination minus the potassium permanganate is the favorite prescription of a very well-known gynecologist of this city in many female ailments. The above was written by a young practitioner, who thought he would improve it by adding the salt which is reputed to be so useful in amenorrhea. The permanganate is decomposed, while the ferrous salt is converted into the irritant and astringent ferric sulphate; thus:

$$2KMnO_4 + 10FeSO_4 + 8H_2SO_4 = 2MnSO_4 + 5Fe_2(SO_4)3$$

Potass. Permang. — Ferrous Sulphate — Sulphuric Acid — Manganous Sulphate — Ferric Sulphate

$+ K_2SO_4 + 8H_2O.$

Potass. Sulphate — Water

194. Ammonii Benzoatis ..... 3 ij
Sodii Benzoatis ..... 3 vi
Tr. Ferri Chloridi ..... 3 iv
Tr. Gentianae ..... ℥ iss
Syr. Aurantii Fl. ..... ℥ i
Aquae .....ad ℥ vi

In this prescription a voluminous precipitate filling the

entire bottle is formed. All soluble benzoates are incompatible with ferric salts, insoluble ferric benzoate being formed. The precipitate is described as flesh-colored, but I do not think that that expression aptly describes it. It is rather a light-brown or buff color. If the two tinctures are mixed first a dark mixture will result, on account of the tannic acid in the gentian producing with the iron the black ferric tannate.

195. Kali Iodati ..... 3 vi
Aquae Regiae ..... 3 ij
Aquae Fontanae ..... ℥ iij
S.: Cochlear parvum post cibum.

This mixture soon turns dark brown. Nitrohydrochloric acid contains free chlorine, which decomposes the potassium iodide, with the liberation of iodine. If taken by the patient, this mixture would be liable to prove extremely irritating.

196. Resorcin ..... gr. iij
Antipyrine ..... gr. viij
Phenacetin ..... gr. ij
M.f. pulv. No. 1. Dent. Tal. Dos. iv. S.: One every hour.

Resorcin is incompatible with antipyrine; when prescribed in powder form, they liquefy, especially in damp weather. There is no way of preventing it, except by placing the resorcin on top of the antipyrine and phenacetin, without any trituration; or by putting the resorcin in separate powders.

197. Tr. Ferri Chloridi 10.0
Resorcinol 5.0
Glycerini 20.0
Aquae 100.0

Resorcin is very similar in most of its reactions to phenol. Carbolic acid is a monatomic phenol, while resorcin is a diatomic phenol, that is, one hydrogen in the carbolic acid is replaced by a hydroxide. The deep violet-blue color of this mixture is due to the reaction between the ferric chloride and the resorcin.

198. Ol. Terebinthinae ..... ʒ iij
Morph. Acetatis ..... gr. i
S.: Every six hours fifteen drops.

This is a somewhat peculiar prescription. On adding the morphine to the oil it will be found that it sticks to the sides and bottom of the bottle, and if dispensed in this way the patient would get no morphine. The way one druggist dispensed it was by adding to the oil an approximately equivalent quantity of oleate of morphine. A more eligible method would be the following: Dissolve the morphine in a little water, add a few drops of olive oil and a few grains of powdered acacia, rub until emulsified, and incorporate the oil of turpentine. Direct the patient to shake the bottle well before using.

199. Tr. Ferri Chloridi ..... ʒ ij
Tr. Valerian. Ammon. ..... ʒ vi
30 drops three times a day.

The aromatic spirit of ammonia employed in making the ammoniated tincture will precipitate the iron as ferric hydroxide. It would be practically impossible to take the medicine by drops or even by teaspoon, as the precipitate is very bulky and gelatinous. There is no way out of the difficulty.

200. Hepar Sulphuris ..... ʒ i
Liq. Hydrogenii Peroxidi ..... ℥ ij
Aquae Rosae ..... ℥ ij
S.: Lotion. Apply at night on gauze.

I doubt whether this lotion, which is expected to beautify the complexion, has any virtue in it whatsoever. The liver of sulphur—or potassa sulphurata—is, as is well known, not a definite compound, but a mixture of all or of several of the following compounds: Potassium monosulphide, K_2S; potassium trisulphide, K_2S_3; potassium pentasulphide, K_2S_5; potassium thiosulphate (wrongly called hyposulphite), $K_2S_2O_3$; and potassium sulphate, K_2SO_4. When dissolved in water, liver of sulphur yields an orange-yellow solution; on adding

peroxide of hydrogen, the solution becomes milky white. All the various sulphides become oxidized to sulphates; the peroxide, of course, becomes reduced to hydrogen monoxide, i. e., water. The milky turbidity is due to the sulphur which precipitates from the thiosulphate.

201. Liver of Sulphur ..... 10 grains
Corrosive Sublimate ..... 4 grains
Rose water ..... 4 fl. oz.

This is a newspaper prescription, given by the newspaper doctor in reply to a request for a lotion to remove freckles. The preparation is worthless. On account of the various compounds of which sulphurated potassa consists, a number of reactions will take place. The chief reaction results in the formation of the black mercuric sulphide, which gives a black, dirty appearance to the mixture.

202. Tr. Ferri Chloridi ..... ℥ ij
Tr. Digitalis ..... ℥ j
Glycerini ..... ℥ iv
Aquae ..... q.s. ad ℨ iij

On mixing the tincture of iron with the tincture of digitalis a dark mixture results. This is due to the tannic acid in the digitalis combining with the iron to form iron tannate. Otherwise the prescription is all right. It is best to mix the tincture of iron with the other ingredients, and add the tincture of digitalis last.

203. Bismuthi Subnitr. ..... ℨ j
Argenti Nitratis ..... gr. iij
Sod. Bicarbon. ..... ℨ vj
Ext. Opii ..... gr. iv
Sacchari ..... q.s. ad ℨ iv
M. et ft. pulvis. Sig: ℨ j t.i.d.

On standing, this powder becomes blackened on account of the reduction of the silver nitrate to silver oxide and then to metallic silver. The reduction is caused by the organic ingredients in the prescription. After a while there is no

silver nitrate left. If the physician insists on having the prescription put up just as written, he can have it. The silver nitrate should be first reduced to a fine powder, then carefully and slowly mixed with the bismuth subnitrate and the sodium bicarbonate; the extract of opium is to be thoroughly incorporated with the sugar, and the powders mixed. This way of compounding will give the best results. The physician is mistaken if he expects the patient to get a uniform dose of silver nitrate and extract of opium in each teaspoonful of powder.

204. Bism. Subnitr. ..... ℥ j
Argenti Nitr. ..... gr. vj
Sod. Bicarbon. ..... ʒ vj
Ext. Opii Aquos. ..... gr. iv
Syr. Aur. Cort. ..... ℥ j
Aquae ..... q.s. ad ℥ iv

The ingredients in this prescription are practically the same as in the previous one, but the reactions are different. This is due to the fact that the mixture is a liquid. The silver nitrate has here three incompatibilities; the opium, the syrup, and the sodium bicarbonate. When a solution of sodium bicarbonate is added to a solution of silver nitrate the latter is at once completely precipitated as the white silver carbonate. In time the latter is reduced, as all silver salts are. There is another possible source of trouble in this prescription; it is between the bismuth subnitrate and the sodium bicarbonate. When standing in a warm place, this mixture may explode, due to the liberation of carbon dioxide. This gas is evolved by the nitric acid, which is liberated from the subnitrate, and acts on the sodium bicarbonate. The equations are as follows:

I. $2BiONO_3 + 2H_2O = BiONO_3 + Bi(OH)_3 + HNO_3$.
II. $NaHCo_3 + HNO_3 = NaNO_3 + CO_3 + H_2O$.

In this prescription only about 2 drs. of the sodium bicarbonate will be dissolved; 4 drs. remain at the bottom of the

bottle, together with the bismuth subnitrate and silver carbonate.

205. Quinin. Hydrochloridi ..... ℥ i
Amm. Carbonatis ..... ℥ i
Syr. Aurantii ..... ℥ ss
Aquae Menthae Pip. ..... ℥ iij

Why physicians will prescribe a very soluble quinine salt and then precipitate it, is beyond comprehension. The quinine hydrochloride dissolves easily in the prescribed quantity of water; but the ammonium carbonate (like all alkaline carbonates) causes a precipitate of alkaloidal quinine.

206. Camphorae ..... gr. xxiv
Morphinae Sulph. ..... gr. vj
Tr. Capsici ..... ℥ ss
Aetheris ..... ℥ ss
S.: 20 drops every ½ hour until attack is over.

This prescription must not be dispensed, as written, under any circumstances. Only a small fraction of a grain of the morphine will dissolve; the rest, about 5¾ grn., will remain in suspension. As the medicine is to be dropped, there is no possibility of adjusting the dose rightly. In one dose there may be only ⅛ grn., while in the next there may be 1 or 2 grn. As these doses are to be repeated frequently, there is altogether too much risk in dispensing the mixture. The reason why the morphine sulphate will not dissolve is because it requires about 700 parts of alcohol for solution, while in ether it is practically insoluble. In such cases it is usually possible to get out of the dilemma by employing the pure alkaloid instead of the salt. Unfortunately, this is not the case with morphine, for alkaloidal morphine requires 300 parts of alcohol and 4,000 parts of ether for solution. The acetate and the hydrochloride of morphine are much more soluble in alcohol than either the sulphate or the alkaloid; but they would not do either, as the most that would dissolve of these drugs in the quantity of the menstruum given would be

from 3 to 3½ grn. This is the way the writer would get over the difficulty: Make up the prescription without the morphine. As the physician evidently intended ¼ grn. of morphine per dose (in the physician's mind drop is always equivalent to minim; 6 grn. divided into 24 doses make ¼ grn. per dose), inclose 24 tablet triturates of ¼ grn. each. At the same time send a note to the physician of about the following contents:

"Dear Doctor:—Morphine sulphate is insoluble in tincture of capsicum and in ether; I therefore left it out and send 24 tablet triturates, ¼ grn. each, instead, so that the patient may take one with each dose of the medicine." I am sure the doctor would feel under great obligation to the pharmacist for pursuing such a course.

207. Sodii Hyposulphit. ..... ℥ ij
Ac. Sulphur. Diluti ..... ℥ iij
Glycerini ..... ℥ iv
Aquae .....q.s. ad ℥ iij
S.: ℥ j in cup of water, for rinsing mouth; also internally, 3 times a day.

This prescription is incompatible, and cannot be dispensed; either the first or second ingredient must be left out.

Sulphuric acid decomposes the sodium hyposulphite (which is chemically sodium thiosulphate, and is now so designated officially) with the precipitation of sulphur and the evolution of sulphur dioxide. The reaction is as follows:

$$Na_2S_2O_3 + H_2SO_4 = Na_2SO_4 + S + SO_2 + H_2O.$$

208. Pepsini Puri ..... gr. vi
Sodii Bicarbon. ..... gr iij
Mf. pulv. Tal. Dos. xx.
S.: One t.i.d. after meals.

Pepsin is considered absolutely incompatible, therapeutically, with sodium bicarbonate or any other alkali. The digestive power of pepsin is supposed to be destroyed by con-

tact with an alkali. Quite likely that this is the case. But I know many physicians who continue to prescribe pepsin with alkalies, because they claim they get good results from the combination. This reasoning is about as follows: The gastric juice always contains hydrochloric acid (and where it does not, like in cancer, then pepsin will be of little avail, anyhow), which neutralizes the alkaline medium, leaving the pepsin free to exert its proteolytic influence. But, some may say, experiments appear to show that the proteolytic power of pepsin, which has been in contact with an alkali, is lost forever; that even after neutralizing the alkali and rendering it acid, the pepsin refuses to work. To some physicians those experiments are not conclusive. A test-tube or a porcelain dish is very different from a living, secreting mucous membrane; and it is just possible that a pepsin, whose powers have become, so to say, dormant from treatment with some chemical, may suddenly awaken on coming into contact with such a membrane. While we do not regard "vital force" with the same superstitious reverence that was accorded it before the epoch-making year of 1828—the year of Woehler's pregnant discovery—still we believe that not all vital phenomena can be or ever will be accounted for by strictly chemical processes, or expressed in chemical equations; and he who sees no difference between a test-tube and a living stomach, has yet a good deal to learn.

209. Pepsini ..... 3 ij
Resorcini ..... 3 j
Saloli ..... 3 j

Antiseptics are considered incompatible with pepsin, as inhibiting its digestive action. Whether they do so in the stomach is still *sub judice*. The salol will have no bad effect on the pepsin, as it is insoluble in the stomach and passes into the bowels, unchanged. The druggist should dispense this prescription without any questions, as it is only a case of (supposed) therapeutic incompatibility.

210. Sol. Fowleri 4.0
Tr. Nuc. Vom. 6.0
Syr. Ferri Iodidi 50.0
S.: Teaspoonful after meals.

The potassium carbonate in the Fowler's solution will precipitate the ferrous iodide as ferrous carbonate, which is itself rapidly decomposed. It will also tend to precipitate the strychnine and brucine in the nux vomica. The iron will combine with the arsenite. As seen, there are three sources of incompatibility in this prescription.

211. Aluminis ..... ℥ ss
Ac. Tannici ..... ʒ ij
Glycerini ..... ℥ ij
Aquae ..... ℥ ij
S.: Shake well, and put teaspoonful in cup of warm water for gargling.

The following note came with this prescription: "The mixture at once turned black; I made it up again with the same result. I made up similar combinations many times before, and it never happened. Can you explain this peculiar reaction?" The druggist was told that undoubtedly the alum contained an appreciable amount of iron. Examination of a sample of the alum proved the correctness of the surmise. Commercial alum is often contaminated with iron.

212. Pepsini Puri ..... ʒ ij
Ac. Hydrochl. Dil. ..... ʒ j
Tr. Gentian. Comp.
Elix. Simpl.
Aq. Menthae Pil. .....āā ℥ j
S.: Cochlear parvum ter in die, post cibum.

Are pepsin and alcohol incompatible? This question is also answered differently by the chemists and by the clinicians. The chemists say alcohol destroys the action of pepsin; the clinicians say it makes no difference, as they get good results from the elixirs and wines of pepsin. Syme's experi-

ments seem to furnish a satisfactory reason for this difference of opinion. He has shown (*Med. moderne,* IX, p. 53) that the alcohol exerts its inhibiting action on the pepsin when both are in a glass or similar inorganic vessel. Something entirely different takes place, however, when the glass vessel is replaced by a moist animal membrane. The alcohol at once begins to diffuse through the membrane, and in a short time the pepsin begins to exert its solvent action on the albumen. In the experiments made, the albumen dissolved after two hours was nearly equal to the amount of albumen dissolved by pepsin in a medium containing no alcohol at all. He, therefore, concludes that pepsin is not incompatible with weak alcoholic media.

213. Ferri et Ammon. Cit. ..... ℥ i
Potass. Iodidi ..... ℥ i
Glycerini ..... ℥ ss
Aquae .....ad ℥ iij

This prescription is all right. The iron and ammonium citrate has a neutral reaction and there is no liberation of iodine, even after standing for a considerable time.

214. Tr. Ferri Chlor. ..... ℥ ij
Quin. Sulph. ..... ℥ ss
Aquae Creosoti ..... ℥ iv

The quinine will dissolve in the water by the aid of the acid present in the tincture of iron; but creosote with ferric salts produce a blue color, changing to a dirty green and brown, with a brown precipitate.

215. Hydrarg. Chlor. Mitis
Sodii Chloridi .....āā 0.3
Pulv. Jalapae

Tal. Dos. No. Decem. S. Unun mane nocteque.

It is remarkable how sometimes a hasty statement made by an investigator after insufficient experimentation will gain circulation in the pharmaceutical press (and also in the med-

ical), be quoted in the dispensaries, become incorporated in text-books, and gain credence as a well-established truth, without anybody taking the trouble to verify or disprove the statement. The above prescription is a case in point. For many years it had been held that to prescribe calomel and sodium chloride in the same powder meant death, or at least great bodily harm, to the patient, from the formation of corrosive sublimate. But is this so? The author believes the prescription is perfectly compatible, and that no corrosive sublimate is formed. In twenty-four consecutive experiments he could find no more than insignificant traces of $HgCl_2$, such as can also be found by triturating calomel by itself, or with water, or with some other inert substance like silica or kaolin. The author was among the first to establish this fact, and to teach his students to answer accordingly at examinations. The Latin signature means: "one powder morning and night."

216. Hydrarg. Chlor. Corros. ..... gr. iv
Potass. Iodidi ..... ʒ ij
Ferri et Ammon. Citr. ..... ʒ i
Tr. Nucis. Vom. ..... ʒ ij
Tr. Cinchon. Compos. .....ad ℥ iv

In many prescriptions we are confronted with a condition of affairs similar to the one in which a physician is when he is face to face with an incurable malady. He knows the trouble, but can offer no remedy. In the above prescription we know exactly what the trouble is, but we know at the same time that there is no way of improving it. The sources of trouble or incompatibility in this prescription are numerous. First of all it is well to be aware that ammonio-ferric citrate, while rapidly and completely soluble in water, is insoluble in alcohol; and as compound tincture of cinchona is made with a menstruum consisting chiefly of alcohol, the salt will not dissolve. That is number one. Second, the corrosive sublimate and potassium iodide precipitate the alkaloids of both the cinchona and the nux vomica. Even if there

were no nux vomica in the prescription, the precipitation of the cinchona alkaloids alone would make the mixture somewhat dangerous; because it is well to remember that when $HgCl_2 + KI$ (iodohydrargyrate of potassium) precipitates an alkaloid, it becomes precipitated with it, in the form of a double salt. So that the mercury would be in the form of a precipitate, and the patient might get too much at one dose. A third cause of unsightliness would be in the black, inky color, produced by the action of the tannic acid present in the cinchona, bitter orange-peel, etc., on the ferric salt. In short, looked at from whatever point of view, the above is a bad combination, and it is advisable to refuse to dispense it.

217. Bism. Subnitrate, Liver of Sulphur } of each ..... ℥ i
Zinc Sulphate ..... gr. x
Lead Water ..... ℥ i
Rose Water ..... ℥ iij

A series of reactions will take place in this prescription. Zinc sulphate and lead water will produce a white precipitate of lead sulphate, and zinc acetate will remain in solution. The liver of sulphur, which consists of several potassium sulphides, will produce zinc sulphide (which is white), and with the lead the black sulphide of lead. Some black bismuth sulphide will also be formed and there will also be a slight precipitation of sulphur.

218. Ferri et Quin. Cit. Solubilis ..... ℥ ij
Potass. Iodidi ..... ℥ iv
Syr. Sarsap. Compos. ..... ℥ ss
Aquae Menth. Pip. .....ad ℥ iv

The potassium iodide precipitates the quinine as quinine iodide; there is also a slight liberation of iodine, due to the fact that ferric salts, namely, those having an acid reaction, decompose potassium iodide with the liberation of iodine, while they become reduced to ferrous compounds.

219. Laetopeptini ..... ℥ j
Sodii Bicarbon. ..... ℥ ss
Hydrarg. Chlor. Mitis ..... gr. v
Antipyrini ..... gr. xv
Sodii Phosphatis ..... ℥ j
Caffein. Citratae ..... gr. xv
Sodii Bromidi ..... ℥ ij
Ft. pulveres No. XII.

The sodium bromide is incompatible with the calomel, converting it into mercuric bromide and mercurous oxide. The antipyrine is slightly incompatible with the calomel; the sodium phosphate when triturated with the citrated caffeine and the other salts liberates some of its water of crystallization, of which it contains 12 molecules and converts the whole into a pasty mass; the small amount of HCl contained in the lactopeptine and the citric acid in the caffeine will liberate some CO_2 from the sodium bicarbonate, etc. In short, this prescription is absolutely non-dispensable.

220. Ac. Salicylici ..... ℥ v
Sodii Bicarbonatis ..... ℨ iss
Aquae Menthae Pip. ..... ℨ iij

"On putting the ingredients in a mortar, considerable effervescence was noticed, but when the effervescence was over, a white powder remained, which no amount of rubbing or shaking could dissolve. What was the powder? Was it a new compound or was it the salicylic acid?" Thus runs the tale of one of my correspondents. No, the powder was neither a new compound, nor was it the salicylic acid. It is true, salicylic acid is but very slightly soluble in water; but in the presence of sodium bicarbonate and water a chemical action takes place and sodium salicylate is formed. Sodium salicylate is soluble in less than one part of water. Five drams of salicylic acid will combine with three drams of sodium bicarbonate (molecular weight of salicylic acid = 138, molec. weight of sod. bicarbonate = 84, which gives us prac-

tically the proportions of 5 to 3); there are still left 9 drams of $NaHCO_3$. Sodium bicarbonate being soluble in 12 parts of water, it would require 108 drams, or 13½ ounces, of water to dissolve the remainder of the sodium bicarbonate in this prescription. There are only 3 ounces of menstruum; nearly an ounce will be used up for keeping the sodium salicylate in solution; in the balance only about 1½ or at most 2 drams of sodium bicarbonate will dissolve. There are still seven drams left undissolved.

This solution will turn dark after standing for some time. All salicylates are likely to turn dark and especially so in the presence of an alkali. I have been frequently asked why physicians should prescribe such combinations and not order sodium salicylate instead. The reason is that experience has demonstrated that such fresh preparations are more acceptable to some stomachs than the regular sodium salicylate. One of the causes of this acceptability is the carbon dioxide with which the solution is saturated.

221. Syr. Ac. Hydriodici
Aquae Oxygenii
Glycerini ..... āā ʒ j
Syr. Aurantii Cort
Aquae Menthae ..... āā ʒ iss

Aqua oxygenii is a synonym for hydrogen dioxide.

This decomposes the hydriodic acid, liberating iodine, and becoming itself decomposed into water. The equation is as follows:

$$2HI + H_2O_2 = 2H_2O + I_2$$

If there be an excess of dioxide the liberated oxygen may oxidize the hydriodic acid to a higher compound.

222. Liq. Hydrogenii Dioxidi ..... ʒ ij
Kali Hypermanganici ..... gr. xxx
Aquae Destill. ..... ʒ iv

Peroxide of hydrogen is an antiseptic, and so is potassium permanganate. Hydrogen dioxide and potassium perman-

ganate are absolutely incompatible. The solution of potassium permanganate is decolorized by the peroxide, with the formation of a precipitate of manganese dioxide and potassium manganate.

The chemical reaction may be represented by the following equation:

$$2KMnO_4 + 2H_2O_2 = K_2MnO_4 \quad MnO_2 + \quad 2H_2O + 2O_2$$

Potass. Permangan. | Hydrogen Dioxide | Potassium Manganate | Mangan. Dioxide | Water | Oxygen

The peroxide of hydrogen usually containing a small quantity of acid for its preservation, a small quantity of manganous sulphate will also be found. The reaction is:

$$2KMnO_4 + \quad 5H_2O_2 + \quad 3H_2SO_4 = \quad K_2SO_4 +$$

Potass. Permangan. | Hydrogen Dioxide | Sulphuric Acid | Potass. Sulphate

$$2MnSO_4 + \quad 8H_2O + 5O_2$$

Manganous Sulphate | Water | Oxygen

Of course, the prescription should not be dispensed.

223. Aconitini ..... gr. j
Div. in pil. No. 24. S.: One pill twice a day.

The author received this prescription with a note asking whether the dose was too large. There is not a single drug or chemical in the entire range of the materia medica the dosage of which has caused so much trouble to physician and to dispenser alike as aconitine has; and this is due to the fact that there is no other drug which varies so much in strength as do various samples of aconitine. Of two samples of aconitine one may be many times stronger than the other. It is time for physicians and pharmacists to know that substances like aconitine, digitalin, etc., are not absolutely distinct entities such as potassium iodide or sodium bromide. The name of the manufacturer is of little importance when the common chemicals are ordered, but it makes all the difference in the world in the case of aconitine or of digitalin. I always claimed that in ordering aconitine, the kind wanted

(whether amorphous or crystallized) and the name of the manufacturer should always be specified. Otherwise a dose might be prescribed which will one time produce no effects whatsoever, and the next time prove fatal or nearly so. In the last edition of "Hager's Handbuch" (1899, page 151) it is distinctly advised to buy aconitine preparations directly from the manufacturer "in original packages, having it stated exactly what quality the preparation is and what its maximum dose."

Aconitine cryst. Merck, and aconitine Duquesnel, are practically identical, and their dose may be stated to be from 1-600 to 1-100 grn. Under no consideration would the writer prescribe or advise a pharmacist to dispense more than 1-100 grn. of crystallized aconitine; he may go as high as one 1-60 provided he is sure that the physician is fully aware of the potency of the drug. The amorphous variety may be prescribed in larger doses. What answer was given to the inquirer regarding the above prescription? On looking into the medical directory, it was found that the physician who wrote the prescription belonged to the eclectic school; there was then no doubt that it was the eclectic resinoid powder that was intended. Of this the dose is from 1-24 to 1-12 grn., and as much as $\frac{1}{8}$ grn. may be given. The druggist was thus advised, and subsequent inquiry from the physician proved that this was correct.

224.	Quinin. Sulph.	℥ ij
	Ac. Sulph. Dil.	q.s.
	Salicini	℥ vi
	Syrupi	℥ i
	Aquae	ad ℥ iv

A correspondent writes that on mixing the quinine with the acid and some water he obtained a perfectly clear solution, but on adding the salicin a precipitate formed at once. "What was the precipitate due to? Was quinine salicylate formed or was salicylic acid thrown out from solution by the

sulphuric acid?" Some people will dig very deep for a cause when the latter is as plain as daylight. No chemical reaction of any kind is formed between the salicin and the quinine or the salicin and the sulphuric acid; in fact, no precipitate of any kind is formed. What was considered a precipitate was simply the excess of the undissolved salicin. Salicin is soluble in about 28 parts of water; consequently only about a dram will dissolve in the menstruum of this prescription; 5 drams will be in suspension; it is this undissolved portion that our correspondent mistook for a precipitate.

225. Cocain. Hydrochlor. ..... gr. vj
Quinin. Sulph. } .....āā ʒ ss
Tannini }
Menthol ..... ʒ i
Aquae Rosae .....q.s. ad ℥ vj
S.: Use as a gargle.

What possible benefit can a patient derive from using such a conglomeration? I am convinced that not only would he derive no benefit, but his condition would become aggravated. The cocaine would be precipitated, as cocaine tannate, which, being insoluble, would have no effect. The quinine would be present partly as quinine sulphate and partly as quinine tannate, both insoluble; the menthol which is here in excessive dose is insoluble in water, and on reaching the fauces and pharynx in an undissolved state would prove intensely irritating; even the astringent effect of the tannic acid would be to some extent destroyed, as a part of it would be used up to form insoluble compounds with the alkaloids. In short, the combination is a worthless one; the patient would have fared much better if the physician had prescribed half a dram of tannic acid in 6 ounces of water. Had the prescription been for internal use there might yet be some shadow of excuse for putting it up; we would say: "Well, the gastro-intestinal juices will decompose the insol-

uble combinations, and their constituents will produce their effect." For a gargle, however, the prescription should not be put up.

226. Boracis ..... ʒ iv
Pulv. Acaciae ..... ʒ i
Aquae Rosae ..... ℥ iv
S.: For external use.

This is a well known incompatibility. If the borax is dissolved in a portion of the water and the acacia in another portion and the two solutions are mixed, a thin, gelatinous precipitate will result which will make the mixture altogether unpresentable. There is no way of obviating the difficulty. It is an instance of true incompatibility.

227. Sodii Boratis ..... ʒ ij
Pulv. Acaciae ..... ʒ i
Syrupi ..... ℥ ss
Aquae Menthae Pip. .....ad ℥ iij
S.: Teaspoonful every 4 hours.

The two principal ingredients in this prescription are the same as in the previous one. Nevertheless this prescription can be dispensed because it contains another ingredient, namely, syrup, which prevents the gelatinization of the acacia. The proper way to make it up is to dissolve the borax in the peppermint water, the acacia in the syrup and mix the two solutions.

228. Aspirini ..... gr. v
Hexamethylenaminae ..... gr. v
Mf. caps. No. 1. Tal. Dos. xxiv.
S.: One three times a day after meals.

One druggist hesitated to dispense this prescription because he had heard or read somewhere that aspirin was incompatible with hexamethylenamin. This is nonsense. I have seen these capsules dispensed hundreds of times without any trouble. It is not necessary to triturate the aspirin and

the hexamethylenamin very vigorously; simply mix them lightly and fill the capsules.

229. Atophan
Urotropin .....āā 0.3
Mf. Pulv. Tal. Dos. xii.
One powder in glass of water.

The same is true of this prescription. There is nothing incompatible between atophan and urotropin. The druggist need have no hesitation in dispensing the prescription.

230. Sodii Boratis ..... ʒ iss
Ac. Salicyl. ..... ʒ i
Glycerini ..... ʒ x
Syrupi .....q.s. ad ℥ iv

The ordinary druggist will simply mix the borax and the salicylic acid with the syrup, overlooking the fact that all the salicylic acid is not soluble in the menstruum. The proper way to dispense this prescription is to dissolve the salicylic acid in a part of the glycerin by the aid of a gentle heat and the borax in the other half of the glycerin. The solutions are then mixed and the syrup added. Made this way a clear solution is obtained without any undissolved salicylic acid in suspension. Another way quite permissible would be to dissolve the salicylic acid in a small quantity of alcohol, dissolve the borax in the glycerin by the aid of a gentle heat, mix the solutions and add the syrup.

231. Liquor. Cresolis Compos. ..... ℥ iv
Hydrarg. Bichlor. ..... gr. vii
Potass. Permangan. ..... ʒ iv
ʒ i in two quarts of water for douche.

This prescription forms an incompatible mess. The reactions that take place in it are too numerous to mention. (1) The potassium permanganate is incompatible with the cresol solution. (2) The mercuric chloride is incompatible with

the cresol solution. (3) The potassium permanganate is incompatible with the mercuric chloride, and (4) The mercuric chloride is incompatible with the cresol solution. The proper way to make up this prescription *is not to make it up at all* and to notify the physician. I know that it is not an extremely pleasant thing to have to send around or to call up the physician and tell him that his prescription cannot be made up; he generally gets ruffled. But in a case like this, nothing else is left to be done. The prescription is too incompatible to be dispensed, and to leave out the potassium permanganate, for instance, might put the druggist into greater trouble with the physician than to attempt to explain matters beforehand.

232. Sodii Salicyl. ..... ℥ iv
Urotropini ..... ℥ ij
Spir. Aetheris Nitrosi ..... ℥ i
Aquae ..... ℥ v

The only difficulty with this prescription is that after a little while it acquires a dark color on account of the action between the nitrous ether and the salicylate of sodium. There is no incompatibility between the salicylate of sodium and the urotropin.

233. Diuretini ..... ℥ i
Potassii Iodidi ..... ℥ ij
Hydrarg. Chlor. Corros. ..... gr. ij
Aquae .....q.s. ad ℥ iij
S.: ℥ i 4 times a day.

This prescription is incompatible. The mercuric chloride and the potassium iodide, which as we know form iodohydrargyrate of potassium, will either at once or eventually precipitate the theobromin. If there was no mercuric chloride in the prescription it could be dispensed with a shake label. But it is rather risky to dispense a prescription which contains mercuric chloride as a precipitate.

234. Phenacetini 4.0
Tr. Ferri Chloridi 8.0
Elix. Simpl. 30.0
Aquae 30.0
S.: Teaspoonful every 3 hours.

While the therapeutic wisdom of prescribing phenacetin and tincture of ferric chloride in the same mixture may well be questioned, still there is nothing incompatible in the combination and the druggist need have no hesitation in dispensing it. The proper way is to rub the phenacetin by itself carefully in a mortar, then add the simple elixir gradually, then the tincture of iron and then the water. Under certain circumstances a red color may result from the action of the phenacetin on the tincture of iron.

235. Protargol 2.0
Aquae 100.0
S.: For external use only.

There is of course nothing incompatible between protargol and water, but the way of dispensing a prescription containing protargol makes quite a difference. If you put the protargol in a mortar and begin to rub it with water you will get lumps. The same thing will happen if you put the protargol in a bottle and fill it with water and shake it. There is only one way of making a protargol solution properly, and that is to measure the prescribed quantity of water in a graduate, and sift the protargol, i. e., spread it over the water with a sifting motion, and let it stand until dissolved. A clear solution is then obtained. The addition of glycerin to the protargol to aid in the solution is not permissible.

236. Ac. Citrici ..... 50.0 gram
Kali Carbonici ..... q. s. ad saturationem
Aquae ..... 500.0 gms.
S.: ℥ ss quaqua nora secunda.

A druggist from Milwaukee sends in the above prescription and asks for a thorough, clear explanation. He writes that

he gets many such and similar prescriptions and is sorely puzzled to know how much to take of the potassium carbonate or of any other ingredient. "What way is there to find out how much of one substance it takes to saturate another? Is there an easy rule, by which one can always go? I have never studied chemistry." The question that our correspondent brings up is a very important one. In a prescription like the above ignorance may lead to disagreeable results. If we add too little potassium carbonate, the solution will be intensely acid, so that the patient may not be able to take it. If we add too much, the result may be still worse, as potassium carbonate is quite poisonous. And still we cannot go here into a full explanation of the subject. To do so would mean to give an exposition of the principles of chemistry. We can only give an outline of the method of arriving at the solution of such and similar problems. The equation between citric acid and potassium carbonate is as follows:

$$2H_3C_6H_5O_7 + 3K_2CO_3 = 2K_3C_6H_5O_7 + 3CO_2 + 3H_2O$$

That is, 2 molecules of citric acid require for neutralization molecules of potassium carbonate. The mol. weight of citric acid is 210, of potassium carbonate, 138. Twice 210 equals 420; three times 138 is 414. In other words 420 parts of citric acid require 414 parts of potassium carbonate, or almost part for part. In this case it will be quite proper to take 50 grams of potassium carbonate.

237. Acidi Salicylici ..... gr. xx
Ferri Pyrophos. ..... gr. v
Sodii Phosphatis ..... ʒ i
Aquae .....q.s. ad ʒ ss
S.: For one dose.

The appearance of a mixture prepared from the foregoing ingredients will vary according to the way it is compounded. The formula is one which originated in the New York Hospital, and the pharmacist recommended the following method of preparing the mixture: Dissolve the sodium phosphate

in water heated to the boiling point, and in the solution so formed dissolve the salicylic acid and ferric pyrophosphate, heat being applied if necessary to complete the solution.

Made in this way the mixture assumes a beautiful claret color, perfectly clear and transparent. It probably owes its color to the formation of a slight amount of ferric salicylate which passes into solution.

238. Liquor. Hydrogenii Dioxidi ..... ℥ iv
Glycerini ..... ℥ ij
S.: ℥ ij after each meal.

Those who see incompatibilities where none exist have asserted that hydrogen dioxide and glycerin are incompatible. There is absolutely nothing incompatible between the two ingredients and a mixture of them may be kept for several months without any fear of deterioration. We so stated in a previous prescription, but there is no harm in an occasional repetition.

239. Ac. Carbolici
Tr. Iodi .....āā gr. xv
Muc. Acaciae ..... ℥ i
Alcoholis (puri) ..... ℥ v

A disagreeable looking mess. Mucilage of acacia spoils the combination without doing any good. It should be left out without any question. Without the mucilage the prescription is all right.

240. Adrenalini Chlor. ..... ℥ ss
Argenti Nitratis ..... gr. v
Aquae ..... ℥ v
S.: Inject 3 times a day.

An absolutely incompatible prescription. The chloride of the adrenalin precipitates the silver nitrate in the form of silver chloride. The adrenalin also reduces the silver to metallic silver while the adrenalin itself is oxidized and becomes worthless. An example of incompatibility which is beyond any hope of relief or improvement. The physician,

who evidently had to deal with a very congested urethra, perhaps one that bleeds on the injection of silver nitrate, tries to obviate the undesirable effects of this salt by using adrenalin. But he only spoils both chemicals. It he does want to get the effects of both the silver nitrate and the adrenalin chloride, the only way to do it is to make them up in two separate injections and tell the patient to use the adrenalin chloride solution, say five or ten minutes after the silver nitrate injection. The doctor orders "adrenalin chloride," but what he means, of course, is the *solution* of adrenalin chloride, 1 to 1,000.

241. Potass. Bromidi ..... ℥ ss
Potass. Citratis ..... ℥ i
Spir. Chloroformi ..... ʒ iii
Aquae .....ad ℥ viii
S.: ℥ ss per dose.

The salts and the water precipitate the chloroform out of the spirit. May be dispensed with a shake label, but it is a disagreeable prescription.

242. Ung. Zinci Ox. ..... ℥ i
Aquae Calcis ..... ℥ iii
Mf. ung.

The doctor orders to make an unguentum. It cannot be done. You cannot make an ointment from one ounce of zinc oxide ointment and three ounces of lime water. The proper way to dispense this prescription is to melt the zinc oxide ointment and mix it with the lime water in a bottle, shaking it well. That will make a nice thin cream.

243. Spir. Camphorae ..... ʒ ii
Aquae Menth. Pip. ..... ℥ iii
ʒ i every hour.

On mixing the spirit of camphor with the water the camphor will precipitate out. There is no way of obviating it except by making an emulsion. It would be better to order the two drams of spirit of camphor separately and tell the

patient to use five minims dropped in a teaspoonful or tablespoonful of water. Then the patient gets the proper dose each time. To dispense it the way it is written, the camphor may not be properly distributed and the patient may get unequal doses of the camphor in each teaspoon. To take the proper amount of camphor (twelve grains), dissolve it in some olive oil, add powdered acacia and make up an emulsion with peppermint water would be all right as far as suspending the camphor is concerned. But that would be taking too many liberties with the prescription.

244. Aluminis ..... ℥ i
Boracis ..... ℥ i
Glycerini ..... ʒ i
Aquae .....ad ʒ viii
S.: Use as a gargle.

While borax with alum gives a precipitate of aluminum hydroxide, still this prescription may be dispensed. The borax is to be dissolved in the glycerin, the alum in the water, and the solutions mixed.

245. Aspirini ..... ℥ ij
Potassii Iodidi..... ℥ iv
Aquae..... ʒ iij
S.: Teaspoon as directed.

It is claimed that aspirin with solution of potassium iodide is apt to decompose with the formation of hydriodic acid. I believe this is a purely theoretical consideration. I know a physician who has dispensed this prescription very frequently for rheumatism and there seems to be nothing whatever the matter with it.

246. Hydrarg. Chlor. Mit. 0.1
Kali Iodati 0.5
M.f. pulv. No. i. Tal. Dos. lx.
S.: Once twice a day, for 3 days, then three times a day for 3 days, then 4 times a day.

Most likely a small amount of mercuric iodide will form

from the calomel and potassium iodide. But as the dose of the calomel is in itself so small we need have no fear on that score. The prescription is in general a bad one. It is a bad practice to prescribe an insoluble substance with a soluble one. Potassium iodide is best prescribed with mercuric chloride or mercuric iodide in solution. Also, in damp weather the powders are apt to become wet from the deliquescence of the potassium iodide.

247. Ac. Hydr. Dil. ..... ℥ i
S.: gtt. x in water after meals.

All that is wrong with this prescription is the way it is written. One cannot be certain what the doctor meant. Did he mean hydrochloric acid, hydrobromic acid or hydriodic acid? Hydr. means anything. And a physician who will persist in writing prescriptions so carelessly should be deprived of his license for 24 hours for each offense.

248. Quin. Bisulph. ..... 3 i
Sodii Benzoatis ..... 3 ii
Aquae ..... ℥ iv
S.: Teaspoonful 4 times a day.

In this prescription we get a bulky precipitate of quinine benzoate. There is also some free benzoic acid. If instead of the quinine bisulphate we use quinine sulphate the precipitate will not be so bulky. Because quinine sulphate being only slightly soluble in water, only a small amount of quinine benzoate will be formed.

249. Quin. Sulphatis..... 3 i
Sodii Benzoatis..... 3 ij
Aquae ..... ℥ iv

See the previous prescription. The best thing is to rub up the quinine sulphate with one-half of the water, dissolve the sodium benzoate in the other one-half, and mix the two solutions.

250. Sodii Benzoatis ..... ℥ iv
Aquae Calcis ..... ℨ iv
S.: 3 i 3 times a day.

The greater part of the sodium benzoate will dissolve. But there will be a precipitate of calcium benzoate. Of course the mixture will no longer contain lime water, the lime having combined with the benzoate to form calcium benzoate. The little calcium benzoate in precipitation is of no value and might as well be filtered out. As a matter of fact it would have been just as well for the physician to order the sodium benzoate dissolved in 4 ounces of plain water. If the physician does not belong to that small type that gets ruffled at each remark, it would be best to notify him of the incompatibility.

251. Ac. Salicyl. ..... ℥ ij
Glycerini ..... ℥ ij
Aquae .....q.s. ad ℨ iij

There is not enough glycerin and water here to dissolve the salicylic acid. Borax increases considerably the solubility of salicylic acid. There are, therefore, two ways of dispensing the prescription: to rub up the salicylic acid with the glycerin and water, allowing as much to dissolve as will dissolve and leaving the rest in suspension, dispensing the prescription with a shake label—or to add about one dram of borax, dissolving the borax and salicylic acid in the glycerin and water by the aid of heat. The prescription can then be dispensed as a clear solution. But whether the pharmacist has a right to add the borax without the physician's permission is a question which cannot be answered dogmatically.

252. Potassi et Sodii Tartr. ..... ℨ i
Ac. Sulphurici Arom. ..... ℨ iij
Aquae Menth. Pip. ..... ℥ ij
S.: 3 ij 3 times a day after meals.

The principal incompatibility here is between the sulphuric acid and the potassium and sodium tartrate. The sulphuric

acid decomposes the salt, potassium bitartrate precipitating. The oil of cinnamon and tincture of ginger (in the aromatic sulphuric acid) will also separate out, giving the mixture a cloudy appearance.

253. Sodii Salicyl. ..... ℥ iij
Syrupi Limonis ..... ℥ i
Aquae..... ℥ iij

The citric acid contained in the syrup of lemon will decompose a portion of the sodium salicylate, crystals of salicylic acid floating in the mixture. The prescription should be dispensed with a shake label. If the physician gives permission to filter out the precipitated salicylic acid that fact should be noted on the prescription so that in repeating the prescription the same procedure may be followed.

254. Sod. Benzoatis ..... ℥ ij
Syrupi Limonis ..... ℥ ss
Syr. Ac. Citrici ..... ℥ ss
Aquae..... ℥ iij

The remarks made in the previous prescription apply with full force to this one. Instead of salicylic acid precipitating we will have benzoic acid precipitated by the citric acid contained in the syrup of lemon and the syrup of citric acid.

255. Pepsini Puri ..... ℥ iii
Ac. Hydrocyan. Dil. ..... ℥ iv
Aquae .....ad ℥ iii
S.: ℥ i after meals.

If the pharmacist put up the prescription as written the patient would probably never take more than one dose of it. He would be dead very promptly after. Though the prescription calls very plainly for diluted hydrocyanic acid, there is no doubt that the physician meant diluted hydrochloric acid, that it was simply a slip of the pen. Ten minims of diluted hydrocyanic acid if of proper strength would very likely prove fatal. In this case the physician was called up,

he was full of thanks and of course he said diluted hydrochloric acid was what he meant.

256. Acetanilidi ..... 3 ss
Spir. Aetheris Nitrosi ..... ℥ ss
Aquae ..... ℥ ss
S.: 3 i q. 2 hr. until relieved.

This prescription acquires a yellow color, gradually turning red. Some complex nitrous compounds are formed due to the reaction between the acetanilid and the spirit of nitrous ether. The compounds formed are not very, at all, poisonous and the prescription may be dispensed. But why physicians will persist in prescribing acetanilid in a liquid mixture is beyond understanding. The only proper way to prescribe acetanilid is in the form of powders, tablets or capsules.

257. Acetanilidi
Resorcini .....āā 15.0
S.: For external use.

When the two chemicals are rubbed together a moist mass or a liquid is obtained. By merely gently sifting the two powders they may be dispensed as a powder but there is always danger of their becoming liquid. Acetanilid should not be prescribed with resorcin.

258. Acetanilidi 15.0
Thymol 5.0
Resorcini 5.0
M.f. pil. No. xv.

When thymol is rubbed with acentanilid a liquid is obtained. Acetanilid and resorcin also form a liquid or semi-liquid mass. The prescription is incompatible: it is impossible to dispense it as a permanent powder.

259. Acetozone ..... 3 i
Aquae ..... ℥ iv
S.: For external use.

Acetozone is only very slightly soluble in water, only 1 in 1560. Only a little over a grain will dissolve in four

ounces of water while here we have 60 grains. It is also well to remember that acetozone the way it comes on the market is mixed with one-half its weight of an insoluble absorbent powder. The proper way to use acetozone is to shake one part of acetozone with 1000 parts of warm water, let the undissolved portion subside and use the supernatant liquid.

260. Pulv. Cretæ Compos. ..... ℥ i
Elix. Vitrioli ..... ʒ i
Aquae ..... ℥ iv
S.: ℥ ss 3 times a day.

This is an absolutely incompatible prescription which the merest tyro should understand and refuse to dispense. Sulphuric acid (elixir vitrioli is aromatic sulphuric acid) will decompose the chalk with the liberation of a large amount of carbon dioxide and the formation of the insoluble calcium sulphate or gypsum. The prescription should not be dispensed, except by leaving out the elixir of vitriol. It is no use putting it in anyway because it becomes destroyed in the chemical reaction.

261. Pulv. Rhei Compos. ..... 3 iij
Ac. Hydrochlor. dil. ..... ʒ ij
Syr. Zingiberis..... ʒ i
Aquae.....ad ℥ iv
S.: 3 ii after meals.

As we know, compound rhubarb powder contains magnesium oxide. This will combine with the hydrochloric acid, forming magnesium chloride. The physician should be informed of the incompatibility so that he may make the proper change in the prescription.

262. Strychn. Sulph. ..... gr. ¼
Ext. Gentianae ..... q.s.
M.f. pil. No. xv.
S.: One 4 times a day.

This prescription is reproduced here because it caused the

writer several extremely anxious hours. Any pharmacist of any experience would understand that the strychnine sulphate was meant to be divided into fifteen pills. But the boss was out when the prescription was presented and the junior clerk made it up, putting ¼ of a grain of strychnine in each pill. The patient, a delicate young woman, took the pill at six o'clock and another one at ten. At about eleven she woke up with a very queer sensation, complaining that she was feeling very funny and that she thought she was dying. It took a very strenuous night of work with the administration of large doses of potassium bromide and chloral before the patient was out of danger.

263. Sodii Glycerinophosph. ..... 3 ii
Div. in pulv. No. xii.
S.: One powder 3 times a day.

It cannot be done. Sodium glycerinophosphate is either in the form of a semi-liquid mass or of very hygroscopic powder. It is impossible to dispense it in powder form. The only way to dispense sodium glycerinophosphate is in liquid form.

264. Potassi Glycerinophosph. ..... 3 i
Div. in caps. No. xii.
One capsule 4 times a day.

It cannot be done. Potassium glycerinophosphate cannot be dispensed in capsules. It is almost a liquid or extremely hygroscopic powder. It can only be dispensed in liquid form.

265. Calcii Glycerophosph.
Potassii "
Sodii "
} .....āā 3 i
Div. in pulv. No. xx.
S.: One powder in water 3 times a day.

Of the three glycerophosphates the calcium is the only one that is not hygroscopic and can be dispensed in powder form. But the potassium and sodium glycerophosphates make the prescription an impossible one.

266. Ac. Benzoici ..... ℥ ij
Aquae Calcis ..... ℥ viij
S.: For external use.

A portion of the benzoic acid will combine with the lime forming calcium benzoate, a small portion will dissolve with what is now plain water and the rest will remain undissolved. It's an exceedingly poor prescription and the physician should be informed both of the incompatibility between benzoic acid and lime water and of the slight solubility of benzoic acid.

267. Ac. Gallici ..... ℥ ii
Ferri Sulph. pulv. ..... ℥ ii
Cupri Sulph. ..... ℥ ss
Zinci Sulph. ..... ℥ ss
S.: 3 i in 2 quarts of water.

As ferrous sulphate always contains some ferric salt there will be a black precipitate or black combination between the gallic acid and the ferrous sulphate. An unpleasant prescription, which a delicate female patient will not appreciate very much.

268. Ac. Tannici ..... ℥ i
Copperas ..... ℥ i
Alum ..... ℥ i
S.: 3 i in quart of water as directed.

This powder dissolved in water will make a nasty inky mixture due to the action between the tannic acid and the copperas or ferrous sulphate. It will soil badly the underwear and the linen, and to prescribe such a combination is equivalent to asking a patient, and a female one at that, to syringe herself with diluted ink.

269. Agurin ..... ℥ i
Sodii Salicyl. ..... ℥ ii
Syr. Limonis ..... ℥ i
Aquae..... ℥ iij
S.: 3 i every two hours.

Agurin is theobromine sodium acetate, which must not be

prescribed with any acids or alkalies. The citric acid in the syrup of lemon decomposes agurin, precipitating the theobromine. It also decomposes the sodium salicylate, precipitating some salicylic acid.

270. Aluminis ..... ʒ i
Boracis ..... ʒ i
Aquae Chloroformi ..... ʒ vi
S.: Use as a gargle or a spray.

There will be a precipitate of aluminum hydroxid due to the reaction between the sodium borate and the alum. That precipitate might as well be filtered out, for it can do no good as a gargle or a spray. It couldn't be used in a spray anyway as it would be at the bottom as a precipitate, and if we shook it well and tried to use it it would clog the spray. The salts will also have a tendency to separate the chloroform out of the chloroform water. It is a bad prescription and the physician should be so informed, of course, in a polite, diplomatic manner.

271. Alumini et Pot. Sulph. ..... ʒ v
Aquae Calcis ..... ʒ viii
S.: For external use only.

Here we have a double incompatibility. The sulphate radical of the alum will precipitate the calcium as calcium sulphate and the hydroxide of the calcium will precipitate the alum as aluminum hydroxide. It is a bad prescription and the druggist is perfectly justified in dispensing five drams of alum dissolved in eight ounces of plain water. The lime water does no good, only mischief.

272. Alypini ..... gr. v
Argenti Nitr. ..... gr. ij
Aquae..... ʒ iv.
S.: Use as injection.

When alypin is prescribed without any specification, alypin chloride is dispensed, this being the usual combination in which alypin appears on the market. Of course the chloride

will give a precipitate with silver nitrate of silver chloride. If it is desired to prescribe alypin with silver nitrate the only way to do is to take alypin nitrate. That avoids the precipitation of silver chloride, though it does not entirely avoid the reduction of the silver nitrate to silver oxide and metallic silver in time.

273. Alypini ..... gr. vi
Sol. Dobelli ..... ʒ iv
S.: Use as spray.

Dobell's solution having an alkaline reaction, alkaloidal alypin will be gradually precipitated.

274. Piperazin ..... gr. x
Antipyrin..... gr. iij
M.f. pulv. Mitte pulv. tal. dos. xxx
S.: One powder 3 times a day.

When piperazin and antipyrin are rubbed together a moist mass is obtained. Even piperazin itself being hygroscopic will become deliquescent when prescribed in powder form. The only proper way of prescribing the two chemicals is in solution.

275. Argenti Nitratis ..... gr. i
Boracis ..... gr. x
Aquae ..... ʒ i
S.: Swab mouth with solution.

A precipitate of silver borate will be formed, which renders the prescription useless for therapeutic purposes.

276. Argenti Nitratis ..... gr. v
Sodii Boratis ..... ʒ ss
Aquae ..... ʒ ii
S.: For swabbing the mouth.

The same reaction of course takes place in this prescription as in the previous one. The physician having failed to obtain any results from the first prescription thought it was due to the small dose of the silver and the borax and decided

to increase them in the next prescription. But this is just as bad, because the silver precipitating out, the astringent and specific effect of the silver nitrate is lost and the prescription is worthless. The physician should be informed that silver nitrate and sodium borate are incompatible.

277. Argonini..... gr. xij
Zinci Sulph. ..... gr. xviii
Aquae destill. ..... ℥ vi
S.: Use as injection night and morning.

Argonin is absolutely incompatible with zinc sulphate. A precipitate is formed. The only way to dispense this prescription is by leaving out either the argonin or the zinc sulphate. But of course the proper way is to inform the physician.

278. Argonini..... gr. vi
Ac. Tannici ..... ʒ i
Aquae ..... ℥ i
S.: For painting sore throat.

The same remarks made in the previous prescription apply to this one. Argonin is incompatible with tannic acid, and the two should never be prescribed in the same mixture.

279. Zinci Sulph. ..... gr. xij
Plumbi Acet. ..... gr. xij
Argonini ..... gr. x
Bism. Subnitr. ..... ʒ ij
Aquae ..... ℥ vi
S.: Shake well. Inject four times a day.

Argonin is incompatible with zinc sulphate and with lead acetate. There is also an incompatibility here between the zinc sulphate and the lead acetate. The prescription is a bad one. If the doctor insists upon having it dispensed the way it is written, he may have it, but he certainly should be informed of the incompatibilities of argonin, and told that the proper way to prescribe argonin is just by itself.

280. Argyrol ..... ℥ i
Zinci Sulph. ..... gr. xij
Aquae ..... ℥ iij
To be used as an injection.

Like most of the organic silver compounds argyrol is incompatible with zinc sulphate and the two should never be prescribed in the same mixture.

281. Argyrol ..... 3 ij
Ac. Tannici ..... 3 ss
Aquae ..... ℥ i
M.f. sol.
S.: For painting the throat.

Argyrol is absolutely incompatible with tannic acid and the two should never be prescribed in the same mixture. The proper way would be to leave out the tannic acid and to inform the physician.

282. Hydrargyri Bichlor. ..... gr. ij
Zinci Sulph. ..... gr. vi
Argyrol ..... 3 i
Bism. Subnitr. ..... 3 ij
Hydrastis Aquos ..... ℥ ss
Aquae .....ad ℥ vi
S.: Use as injection. Shake well.

Argyrol is incompatible both with zinc sulphate and with mercuric chloride. In fact mercuric chloride and argyrol form one of the finest examples of incompatibility. It might not be out of place to state here that mercuric chloride is one of the most efficient substances we have to remove stains of argyrol on the hands or linen.

283. Sol. Donovani ..... ℥ i
Strychn. Sulph. ..... gr. ij
S.: gtt. x in water t. i. d. p. c.

This is a dangerous prescription. The mercuric iodide and the arsenic iodide would precipitate the strychnine and the patient might get an overdose towards the end.

284. Liq. Arseni et Hydrarg. Iod. ..... ℥ iij
Quin. Hydrochlor. ..... ℥ ss
Strychn. Sulph. ..... gr. i
Aquae .....ad ℥ iij
S.: ℥ i ter in die p. c.

The same remarks apply to this prescription. Both the quinine and the strychnine would gradually precipitate in combination with the arsenic and mercuric iodide.

285. Liq. Ac. Arsenosi ..... ℥ iv
Syr. Hypophosphit. Comp. ..... ℥ iv
S.: ℥ i in water after meals.

The hypophosphites, it is claimed, will reduce the arsenous oxide to metallic arsenic. Still it is not a dangerous prescription to dispense, though it is better to notify the physician of the incompatibility.

286. Auri et Sodii Chlor. ..... gr. ij
Liq. Potass. Arsenitis ..... ℥ i
S.: gtt. x in water three times a day before meals.

The potassium arsenite reduces the gold chloride to metallic gold. The prescription is considered an incompatible one.

287. Sodii Benz. 15.0
Ac. Phosph. Dil. 10.0
Syr. Limonis 25.0
Aquae ad..... 150.0

One would think that even the oldest medical graduate who forgot or never knew any chemistry would not prescribe sodium benzoate with an acid. Still this was written by a rather prominent physician. It was probably an oversight on his part. The brightest physician will now and then make a blunder in prescribing. His mind is occupied with the diagnosis and prognosis of the case before him and he cannot be blamed if the fine chemical points are not always present in his mind. Of course it is the duty of the pharmacist to be

on the lookout and to call to the physician's attention any dangerous or impossible incompatibilities.

288. Sodii Benzoatis ..... ʒ iij
Ac. Citrici ..... ʒ ij
Aquae ..... ℥ iv
S.: ʒ i 4 x a day.

The same is true of this prescription. The citric acid will decompose the sodium benzoate with the precipitation of benzoic acid.

289. Mist. Rhei et Sodae..... ℥ vi
Ac. Hydrochlor. Dil. ..... ʒ ij
S.: Tablespoonful after meals.

The hydrochloric acid will decompose the sodium bicarbonate present in the mixture of rhubarb and soda, with the evolution of carbon dioxide and the formation of sodium chloride. Of course nothing dangerous will be formed here, but it would be a shame to dispense the prescription as written and the proper thing would be to inform the physician that one cannot eat his cake and keep it—that one cannot prescribe an acid and an alkali in the same mixture with the expectation of having both. If he wants the alkaline effect of sodium bicarbonate he should prescribe the mixture of rhubarb and soda without hydrochloric acid, and if he wants the effect of hydrochloric acid he should prescribe it without the rhubarb and soda.

290. Mist. Rhei et Sodae..... ℥ iv
Pepsini Puri ..... ʒ ij
S.: ʒ i after each meal.

This is a therapeutic incompatibility. Pepsin is supposed to become ineffective when in contact with an alkali. Of course nothing poisonous or dangerous or unsightly is formed here and the prescription may be dispensed.

291. Pepsini ..... ʒ ij
Ac. Hydrochlor. ..... ʒ ij
Bism. et Amm. Citr. ..... ℈ ss
Aquae ..... ℥ iv

The hydrochloric acid decomposes the bismuth salt, splits it up, bismuth citrate being precipitated. Bismuth and ammonium citrate should never be prescribed with hydrochloric acid.

292. Bism. Subnitr. ..... ʒ iv
Potass. Iodidi ..... ʒ iv
Elix. Pepsini ..... ℥ i
Aquae ..... ℥ iv
S.: ʒ i three times a day.

In this prescription there is a gradual formation of the red bismuth iodide. It may be dispensed, but the patient should be cautioned beforehand that the mixture will undergo a certain change in color.

293. Bism. Subnitr. ..... ʒ ij
Ac. Tannici ..... ʒ i
Syrupi ..... ʒ iv
Aquae, q.s. ad..... ℥ ij
S.: Teaspoonful as required.

In this prescription there will be a gradual formation of the yellow tannate of bismuth. It may be dispensed but the patient should be told of the change that will likely take place in the mixture.

294. Caffein. Citr. ..... ʒ i
Sodii Brom. ..... ʒ ij
Strontii Brom. ..... ʒ i
Aquae Foeniculi ..... ℥ iij
S.: ʒ i every three hours.

Here there will be a decomposition between the citrated caffein and the strontium bromide, with the formation of strontium citrate, which is insoluble in water and precipitates.

295. Caffein. Citr. efferves. ..... ℥ ij
S.: 3 i in water as required.

This prescription was dispensed in a paper box and in a short time it became converted into a wet lumpy mass. Effervescent citrated caffeine is hygroscopic and should be dispensed in well stoppered bottles only.

296. Airol
Calomel .....āā 5.0
S.: Apply externally.

After a while, particularly in the presence of moisture, there will be formed some red mercuric iodide. Airol, which is chemically bismuth iodo-subgallate, rather readily yields its iodine, and this reacts on the calomel to form red mercuric iodide. On a delicate surface like the prepuce this powder may prove quite irritating if a considerable amount of mercuric iodide is formed.

297. Caffein. Sod. Benz. ..... 3 ij
Ac. Hydrochlor. Dil. ..... 3 i
Pepsini ..... 3 ij
Aquae ..... ℥ iij
S.: 3 i after meals.

The hydrochloric acid splits up the double salt of caffeine and sodium benzoate, and besides decomposes the sodium benzoate, with the precipitation of benzoic acid.

298. Bism. Salicyl. ..... 3 iv
Pepsini puri ..... 3 ij
Ac. Nitrohydrochlor. Dil. ..... 3 ij
Syr. Zingiberis ..... 3 vi
Aquae, ad..... ℥ iv
S.: 3 ii after meals.

Bismuth salicylate is incompatible with acids. The acid decomposes the salt with the liberation of salicylic acid. The prescription should not be dispensed. The physician should be informed of the incompatibility and should leave out either the bismuth salicylate or the acid.

299. Asaprol ..... ℥ ij
Dermatol ..... ℥ iv
Ac. Nitrohydrochl. Dil. ..... ℥ ij
Elix. Simpl. ..... ℨ i
Aquae .....ad ℨ iij
S.: Teaspoon in water after meals.

Asaprol is bismuth betanaphtholate. Dermatol is bismuth subgallate. Both are incompatible with acids, which decompose them, splitting off the betanaphthol in the first instance and gallic acid in the second. In this prescription the acid should be left out. The physician should be notified so that he may prescribe the acid separately.

300. Calcis Sulphuratae ..... ℥ i
Div. in pulv. No. xij.
S.: One powder one hour after each meal.

Crude calcium sulphide should not be dispensed in powders because it is easily decomposed by the carbon dioxide of the air, liberating sulphuretted hydrogen. The proper way to prescribe it is in the form of tablets in well closed bottles.

301. Spir. Camphorae ..... gtt. x
Aquae ..... ℨ iv
S.: ℥ i per dose.

On mixing the two, the camphor will precipitate. As there is but a small quantity of camphor, a much better way would be simply to use the official camphor water.

302. Camphorae.
Ac. Carbolici .....āā ℥ ij
S.: For external use.

When camphor and phenol are rubbed together a liquid is obtained. In this case the mixture should be rubbed in a mortar until a perfectly clear solution is obtained. The solid phenol should be taken and not the liquid, as the liquefied phenol containing as it does a certain amount of water makes a turbid solution with camphor.

303. Camphorae Monobrom. ..... gr. iij
Chloralis Hydrati ..... gr. v
M.f. caps. No. 1. Tal. Dos. xxiv.
S.: One on going to bed.

When monobromated camphor is triturated thoroughly with chloral, a soft mass is obtained. The prescription, however, can be dispensed, but care must be taken not to triturate the monobromated camphor and the chloral too strongly.

304. Carbo Anim. ..... ℥ i
Tr. Nuc. Vom. ..... ℥ ss
Tr. Cinchon. Comp. ..... ℥ ij
Tr. Zingiberis ..... ℥ i
Aquae, ad..... ℥ viii
S.: ℥ ss t.i.d. p. c.

Charcoal is supposed to precipitate alkaloids. Still the prescription may be dispensed and if well shaken there is little danger. It is not a pleasant mixture to take, but some physicians, and some patients, too, still think that the nastier a medicine tastes, the more efficient it must be.

305. Chloral Hydrati
Camphorae .....āā ℥ ss
S.: For external use only.

When chloral and camphor are triturated together they form a clear liquid and the pharmacist should be careful not to dispense the prescription except in the form of a clear liquid. This injunction may seem superfluous, but for the fact that the writer only recently saw a druggist dispense the above prescription in a box in the form of a powder. He powdered the camphor all right, then powdered the chloral separately, mixed the two and put them in a box. Naturally a sticky mass was the result, which was entirely different from what the physician expected.

On the other hand the writer knows of a case where the physician was both surprised and indignant when the above prescription was delivered in a bottle as a liquid. He was

sure that a mistake had been made because he was under the impression that he would get a powder, which was to be sprinkled over an ulcer.

306. Chloral
Camphor ..... āā ʒ iij
Phenol ..... ʒ i
S.: Apply externally.

The remarks of the previous prescription apply to this one as well. It might be added that the pure crystallized and not the liquefied phenol should be used.

307. Chloretone ..... ʒ i
Menthol ..... gr. x
Ac. Borici ..... ℥ ss
M.f. pulv. For external use.

When equal parts of chloretone and menthol are rubbed together a liquid is obtained. In this case, however, the prescription may be dispensed because it contains only 10 grains of menthol. The proper way would be to rub the chloretone with half the boric acid, the menthol with the other half and then mix the two powders.

308. Hydrarg. Bichlor. 1:5000
Chinosol ..... 1:1000 } āā.....250.0
S.: For external use.

Chinosol is incompatible with mercuric chloride and while both are excellent antiseptics the two should never be prescribed together.

309. Potass. Chloratis ..... ʒ ij
Sodii Thiosulph. ..... ʒ i
Glycerini ..... ℥ ss
Aquae .....ad ℥ vi
S.: ʒ i four times a day internally; also to be used mixed with water as a gargle.

In an acid solution sodium thiosulphate reduces chlorates with the liberation of chlorine and hydrochloric acid. This

prescription, however, may be dispensed, only care should be taken not to triturate the sodium thiosulphate with the potassium chlorate, as a little explosion might perhaps result.

310. Potassii Chloratis ..... gr. iij
Hydrarg. Chlor. Mitis..... gr. i
Sacchari ..... gr. v
M.f. pulv. No. 1. Tal. Dos. xij.
S.: One 4 times a day.

One druggist, who was also a physician, refused to dispense this prescription because he was taught or he had read or thought he had read somewhere that potassium chlorate will oxidize calomel to mercuric chloride. There is no foundation for this alleged fact and the prescription may be dispensed.

311. Potassii Chloratis ..... ʒ ij
Hydrarg. Chlor. Miti..... ʒ i
Bism. Subnitr. ..... ʒ i
M. f. pulv. For external use.

The same may be said about this prescription. It may be dispensed without any apprehension. The potassium chlorate should be powdered separately, or should be used in fine powder and the three powders should be mixed lightly.

312. Magnesii Sulph. ..... ℥ i
Aquae Crotonis ..... ℥ iv
S.: ℥ ss every hour.

This prescription is presented here for its "funniness" and the writer can vouch for the fact because he witnessed it himself. The prescription was presented to the boss, who handed it to the clerk, a very excellent prescriptionist, but not long in this country. He weighed out one ounce of magnesium sulphate, then went to the poison closet, took the croton oil, put eight drops in a mortar, put some magnesium carbonate in the mortar and began to add the water gradually, triturating briskly and getting ready to filter the mixture. When the boss asked him what he was doing, he said he was preparing Croton water, and he was used to preparing

"waters" extemporaneously by rubbing up two drops of the oil with an ounce of water. He did not know the expression "Croton water" which simply referred to New York tap water. He thought the physician wanted a "croton oil" water. He felt strengthened in his assumption by the fact that the prescription was meant as a cathartic and there was nothing more plausible than to have some croton oil and magnesium sulphate in the same mixture.

℞ Barii Sulph. ..... ℥ ii
S.: For doctor's use.

There is no better illustration of the necessity for physicians writing out a prescription clearly, distinctly and fully wherever there may be the slightest possibility of misunderstanding, than the above prescription. It also shows the importance for a druggist to be up to date, to know what is going on in the line of materia medica and therapeutics, to be fully *au courant* with what physicians are apt to prescribe. The above simple prescription of just one line cost a man his life, caused the arrest of two physicians and of the druggist, and an endless amount of anxiety and expense to all three, besides the anguish and the suffering of the family of the dead man.

Druggists have for many years been dispensing barium sulphide, which, as is well known, is used as a depilatory to remove superfluous hair. The druggist who received the above prescription did not know that of late we have been using very frequently barium sulphate (instead of bismuth subnitrate) in taking x-ray pictures of the gastro-intestinal canal. So when the druggist received the above prescription he promptly dispensed two ounces of barium sulphide. On receiving the bottle the physician emptied it, mixed it with the proper amount of water and made the patient drink it. The patient very soon began to feel badly and in an hour he was dead in spite of all that was done to save him.

Now, barium sulphate is harmless because it is insoluble in the stomach and intestines, is not absorbed by the system and is passed out with the feces. Barium sulphide is poisonous and is not to be used internally except in very small doses.

314. Calcii Chloridi ..... ℥ j
Pulv. Cretae Compos. ..... ℥ iij
Aquae .....q.s. ad ℥ ij
S.: ℥ i every 2 hours.

The above prescription very nearly cost a little baby its life. Here there was no excuse for the druggist—it was plain ignorance. It was plainly written as above, *calcii chloridi.* But the drug clerk had never dispensed calcium chloride. He knew calx chlorinata and he took a dram of that and put it in the prescription. The baby, who was suffering with a severe bloody diarrhea, began to choke, became blue in the face, and it looked as if it would strangle any moment. Fortunately, however, after a severe attack of vomiting, it began to feel better. The mother ran to the druggist with the bottle and asked him if a mistake had not been made. He of course said no, but by a lucky accident the physician had just come into the store and hearing what the trouble was asked to look at the bottle. He smelled it and noticed a strong odor of chlorine, and then he told the druggist on the quiet behind the prescription counter that there must be some mistake, that calcium chloride has no odor of chlorine, that he prescribed it a number of times, and while it has not a pleasant taste it will not make any child choke and get cyanotic. With the help of the doctor the matter was straightened out and the child was not any the worse for it. In fact it seemed to make very favorable progress after that. It is possible that the chlorinated lime had a good disinfectant effect on the gastro-intestinal canal, but the infant could have lost its life.

315. Collodii
Tr. Iodi .....āā ʒ ij

There is nothing wrong with this prescription. It may be dispensed as written.

316. Heroini ..... gr. iv
Ammon. Carbon. ..... ʒ ij
Syr. Pruni Virgin..... ʒ i
Aquae .....ad ℥ iij
S.: ʒ i q. 3 hours.

When heroin is prescribed without any specification, heroin hydrochloride is usually dispensed. Heroin being an alkaloid will be precipitated by the ammonium carbonate and by the tannic acid of the syrup of wild cherry. Still I have seen it dispensed many times without any trouble, only it is safer to dispense it with a shake label.

317. Adrenalin ..... ℥ ss
Aquæ Hydrogenii Dioxidi ..... ℥ iijss
S.: For external use.

This prescription is absolutely incompatible and should not be dispensed. The adrenalin is completely decomposed or oxidized by the hydrogen dioxide.

The physician writes for one-half ounce of "adrenalin." What he means of course is one-half ounce of the solution of adrenalin chloride 1 to 1000. It would be a mighty expensive prescription if it were to contain one-half ounce of pure adrenalin.

318. Sol. Epinephrini ..... ʒ ij
Hydrarg. Chlor. Corros. ..... gr. i
Aq. Destill. ..... ℥ vi
Use as injection.

Absolutely incompatible. The epinephrin is decomposed and the mercuric chloride is reduced to calomel and then to the metallic state.

319. Exalgin ..... gr. v
Phenacetin ..... gr. v
M.f. pulv. No. 1. D. T. D. xij.
S.: One powder when required.

When exalgin is triturated with phenacetin a moist or a soft mass is obtained. The prescription cannot well be dispensed in powder form. It can be dispensed by putting the exalgin and the phenacetin in separate powders and directing the patient to take one of each powders at a dose. It can also be dispensed in capsules by putting five grains of each of the ingredients in a capsule without any mixing or trituration.

320. Exalgini
Phenacetini .....āā gr. iii
Sodii Salicyl.
Ac. Salicyl. .....āā gr. v
M. pulv. Tal. Dos. xxx.
One 3 times a day.

The first two ingredients in this prescription are the same as in the previous one and the same remarks hold good. We could make one powder containing the phenacetin, sodium salicylate and the salicylic acid, another powder containing the exalgin, and direct the patient to take one powder of each kind.

321. Creosoti ..... ʒ i
Guaiacol ..... ʒ iij
M.f. pil. No. xxx.
S.: One pill four times a day.

It simply cannot be done. It is no use attempting to make pills containing two minims of creosote and six minims of guaiacol. The writer is well aware of the various maneuvers and excipients employed to make creosote and guaiacol pills. In fact he himself used to be an expert in this field and as a pharmacist was very proud of his ability to turn out in quick order two, three or five hundred creosote pills. By

using a little yellow wax, melted of course, also some powdered licorice or magnesia, etc., some sort of pills can be made. But all this is nothing but a waste of time and energy —it is a showing-off of useless virtuosity. It is the writer's opinion, his opinion as a physician and not a pharmacist, that no decent creosote pills can be made that would do the patient any good. Made in the form of pills the quantity of the creosote must be so small as to be hardly of any value, and if made to contain a considerable amount of creosote with very little excipient, the effect is apt to prove irritating and caustic. The proper way to administer creosote is in liquid form, properly diluted, or in the form of some of its chemical combinations. It would be a very fair and honest thing to enlighten the physician on this point, so that he may be discouraged in the future from ordering creosote or guaiacol in pill form.

322. Creosote
Guaiacol
Creosotal
Duotal
Thiocol .....āā gr. v
M. pulv. Tal. Dos. 200

S.: One powder night and morning and after each meal.

Of course this is a ridiculous prescription. The physician was very anxious to cure his patient and to give him at once all the anti-tuberculosis remedies that he had heard of. But he overlooked the fact, or perhaps he didn't know it, that creosote and guaiacol and creosotal are liquids and cannot be dispensed in powder form. Duotal, or guaiacol carbonate, and thiocol, potassium guaiacol sulphonate, are crystalline substances and can be dispensed in powders. There are no two ways about this prescription—the only thing the druggist can do is to notify the physician and advise him to dispense the first three ingredients in liquid form and the second two in powder form or to dispense them all in a liquid mixture.

323. Mass. Ferri Carbon. ..... gr. v
Ac. Salicyl. ..... gr. iij
M.f. pil. No. 1. Tal. Dos. XL.
One ter in die p. c.

These pills are likely to burst open. The salicylic acid decomposes the ferrous carbonate with the liberation of carbon dioxide, which gradually breaks up the pill.

324. Ferri Carbon
Sodii Carbon. ..... āā gr. v
M. pil. No. 1. Tal. Dos. No. C.
S.: One t.i.d.

Ferrous sulphate and sodium carbonate are often prescribed to make fresh ferrous carbonate. The writer is strongly of the opinion that what the physician intended to write was ferrous sulphate. If he really meant ferrous carbonate, then there is no reason for having the sodium carbonate in. Of course the prescription can be dispensed, but in the writer's opinion it would be a kindness both to the physician and the patient to communicate with the former so as to make sure whether that is what he wanted.

325. Strych. Sulph. ..... gr. i
Quin. Sulph. ..... gr. xxx
Sodii Glycerophosph. ..... ʒ iss
M.f. pil. No. 1. Tal. Dos. XXX.

First of all you will notice the physician has made a mistake in the directions. He writes *tales doses*, that is, he wants each pill to contain one grain of strychnine, 30 grains of quinine and 1½ drams of sodium glycerophosphate. What he meant of course was *to divide* into thirty pills. Then each pill would contain 1-30 of a grain of strychnine, 1 grain of quinine and three grains of sodium glycerophosphate, which is quite proper. But even with that correction, the prescription is not a very good one, because it is pretty difficult to make satisfactory pills which should contain three grains of sodium glycerophosphate. But with a little magnesia, licorice

or althea, it can be managed. The pills, however, would be too large, and it would not be a bad idea to inquire of the physician if he would not prefer to substitute calcium glycerophosphate for the sodium glycerophosphate.

326. Guaiacolis Crystall..... 15.0
Div. in pil. No. L.
Two pills three times a day.

There is a pure crystallized guaiacol which can be made into pills, but it readily deliquesces and it is best to prescribe guaiacol, as stated in a previous prescription, in liquid form.

327. Hydrarg. Ammon. ..... ℥ i
Sulphuris ..... ℥ ij
Potassii Carbon. ..... ℥ ss
Adipis ..... ʒ i
For external use.

When made up this ointment is yellowish white. But after a while it gets darker until it becomes gray or black. There is a reaction between the sulphur and the potassium carbonate and the ammoniated mercury, by which some sulphide of mercury and the black mercur-ammonium chloride is formed.

328. Hydrarg. Chlor. Corros. ..... gr. iv
Potassii Iodidi ..... ʒ iv
Aquae ..... ℥ vi
S.: ℥ i 4 x a day.

Of course this prescription is all right. It is one of the commonest prescriptions that a druggist has to dispense. Nevertheless, strictly speaking, it is incompatible because mercuric iodide is formed which redissolves in an excess of potassium iodide, forming the double iodide of potassium and mercury, the so-called iodohydrargyrate of potassium or Mayer's reagent, which is such an excellent precipitant of alkaloids.

I know of a case of a junior clerk who refused to dispense this prescription. When he mixed the mercuric chloride

and the potassium iodide and noticed the formation of a red precipitate, he being a careful young fellow, was afraid to dispense it. He waited until the senior clerk came in, who explained to him that the precipitation was all right.

329. Hydrargyri Chlor. Cor. ..... ℥ ij
Potassii Iodidi ..... gr. ij
Syr. Sarsap. Comp. ..... ℥ iij
Aquae ..... ℥ i
S.: Teaspoon 3 times a day.

An experienced druggist will have no difficulty with this prescription. He will notice at once that the doctor absent-mindedly turned the quantities of the two principal ingredients around. He meant two grains of mercuric chloride and two drams of potassium iodide, but instead he wrote two drams of mercuric chloride and two grains of potassium iodide. Of course, made up the way the prescription is written, a teaspoonful of the medicine would kill the patient. I am personally of the opinion that he made the same mistake with the syrup and water, that he really meant one ounce of syrup and three ounces of water. But as it is of little consequence whether one ounce or three ounces of compound syrup of sarsaparilla is dispensed, the quantities of the last two ingredients may be dispensed as written.

330. Hydrarg. Bichlor. ..... gr. i
Liq. Fowleri ..... ℥ ss
S.: gtt. viii in water after meals.

This prescription is incompatible. The mercuric chloride is reduced to calomel and to metallic mercury, while the arsenite is changed into arsenate. The prescription is incompatible and should not be dispensed.

331. Hydrargyri Chlor. Corros. ..... gr. iv
Aquae Calcis ..... ℥ iv
S.: For external use.

This prescription, while chemically speaking incompatible,

is all right. It forms the well-known yellow wash (Lotio Flava). When lime water is added to mercuric chloride the yellow mercuric oxide is formed. The reaction is as follows:

$$HgCl_2 + Ca(OH)_2 = CaCl_2 + HgO + H_2O$$

332. Hydrargyri Chlor. Corros. ..... ʒ ss
Aquae Calcis ..... ℥ viij
S.: Poison. For external use.

In this prescription we also get a precipitate of the yellow oxide of mercury. But the prescription contains too much mercuric chloride and if it is to be applied to an infant, to a delicate surface, or to a raw surface, it should be done with great caution as great irritation of the skin may occur, or even an absorption of mercuric chloride, which may cause dangerous or toxic symptoms.

333. Hydrargyri Chlor. Mitis ..... ʒ ss
Aquae Calcis ..... ℥ vi
S.: Apply externally every hour.

This forms the well-known black wash which is a favorite application to chancroids, phagedenic ulcers and so forth. When calomel is added to lime water the black mercurous oxide is formed. The formula is as follows:

$$2HgCl + Ca(OH)_2 = CaCl_2 + Hg_2O + H_2O$$

334. Ung. Iodi ..... ʒ ij
Ung. Belladon. ..... ʒ vi
Hydrarg. Chlor. Mit. ..... gr. xx
M.f. Ung.—S. Pile Ointment.

It is not advisable to prescribe iodine (elementary iodine) and mercurial salts in the same prescription. Red mercuric iodide is apt to form, which is very irritating. Calomel in ointment form acts well in hemorrhoids. But red mercuric iodide even in very dilute preparations is painful and irritating, as it has proved in this case.

335. Hydrargyri Salicyl. 10.0
Aqu. Destill. 100.0
S.: Hg. Salicyl. 10%.

Salicylate of mercury is insoluble in water, but is soluble in the halogen compounds of the alkalies, such as potassium chloride, sodium chloride, etc. The best way to make up this prescription is to dissolve the salicylate of mercury in 100 c. c. of a normal salt solution, i. e., 7-10 per cent. solution of chemically pure sodium chloride.

336. Fluidext. Hyoscyami ..... ℥ ij
Potassii Bicarbon. ..... ʒ iij
Fluidext. Tritici ..... ʒ iv
Fluidext. Buchu ..... ʒ ij
Aquae .....ad ℥ iij

The pharmacist or physician who has learned that alkaloids must not be prescribed with alkalies might be afraid to write or dispense the above prescription, thinking that the potassium bicarbonate would precipitate the alkaloids of hyoscyamus. But it so happens that the alkaloids of hyoscyamus, i. e., hyoscyamine and hyoscine, are not precipitated by alkalies, and so the above prescription may be safely dispensed. It is a very common and useful prescription in cystitis.

337. Ichthyol ..... ʒ i
Zinci Sulph. ..... gr. xviij
Aquae ..... ℥ vi
S.: Inject 3 times a day.

This prescription is absolutely incompatible and cannot and must not be dispensed. An unsightly precipitate is formed from the combination of the ichthyol with the zinc. The physician must be informed so that he may change the prescription or order the two ingredients in different injections.

338. Iodoformi ..... ʒ i
Bals. Peruviani ..... ʒ ij
Adipis Benz. ..... ℥ iss
S.: Apply on lint.

Certain statements have been made that iodoform is incompatible with balsam of Peru. There is no foundation for these statements. The two go very well together and the prescription is perfectly all right.

339. Tr. Iodi ..... ʒ ij
Aq. Ammon. ..... ʒ iv
Linim. Saponis ..... ℥ iv
S.: For external use.

The iodine will combine with the ammonia to form ammonium iodide. Where there is sufficient ammonia to combine with the entire amount of iodine the color of the iodine will be destroyed and the preparation will be colorless because ammonium iodide is colorless. Whenever iodine is brought into direct contact with ammonia, there is also slight danger of iodide of nitrogen being formed, which is an explosive compound. But in small quantities, with which we generally have to deal in prescriptions, the danger is more a theoretical than a practical one.

340. Ung. Iodi ..... ʒ ij
Ung. Hydrargyri ..... ʒ vi
M.f. Ung. S. Apply 3 times a day.

The iodine combines with the metallic mercury and with the oxide of mercury which is usually present in the mercurial ointment to form mercuric iodide. This is much more irritating than either iodine ointment or the mercurial ointment itself. As this prescription is often ordered for epididymitis and orchitis, and as the skin of the scrotum is very tender, it, i. e., the skin, is often completely removed by this ointment. It also burns very severely in some cases. If it does, the only thing to do is to wash it off with soap and warm water and then apply an emollient ointment like cold

cream or zinc oxide ointment, or some talcum powder or bismuth subnitrate.

341. Liq. Formaldehydi
Liq. Hydrogenii Diox. .....āā ℥ viij
S.: Use externally as directed.

This prescription is absolutely incompatible. The formaldehyde is oxidized by the peroxide of hydrogen to formic acid, and the H_2O_2 is decomposed. An example of trying to get too much and of getting nothing.

342. Lithii Citratis ..... ʒ ij
Sodii Phosphatis ..... ℥ ij
Aquae ..... ℥ iv
S.: ʒ ij in glass of water night and morning.

In this prescription we get a precipitate of lithium phosphate. Of course it may be dispensed with a shake label.

343. Magn. Sulphatis
Sodii Phosphatis .....āā ℥ iv
S.: ʒ ij in glass of water on going to bed.

Here we get a precipitate of magnesium phosphate. It would be much better to dispense the magnesium sulphate and the sodium phosphate in separate containers, and tell the patient to take a spoonful of each in half a glass of water, and drink them separately. It is better the reaction should take place in the stomach than in the glass.

344. Menthol ..... ʒ i
Alcohol ..... ℥ i
Aquae ..... ℥ iv
S.: Apply externally.

The menthol dissolves rapidly in the alcohol, but on adding the water it precipitates. We get a cloudy mixture with the menthol precipitated out. Incompatible prescription, which, honestly speaking, should not be dispensed.

345. Tr. Ferri Chloridi..... ℥ i
Methyl Salicyl. ..... gtt. x
S.: gtt. x in water after meals.

Here one can see that the methyl salicylate has been prescribed for the express purpose of disguising the color of the tincture of iron. One-twenty-fourth of a drop of methyl salicylate (which is the dose in this case) can have no medicinal action. But as patients are familiar with ordinary tincture of iron and are apt to sneer at it, physicians often disguise its color either with a little antipyrine or sodium salicylate or any other salicylate.

346. Ol. Olivae ..... ℥ ij
Menthol ..... ʒ i
Glycerin ..... ℥ ij
S.: For external use.

Menthol is very soluble in olive oil as in all fixed or volatile oils. But the oil is not miscible with glycerin, contrary to the impression of many physicians. As stated elsewhere, many people, both lay and professional, regard glycerin in the nature of a fat and think it must be miscible with other fats. But it is not. This prescription does not make a very elegant mixture, but may be dispensed with a shake label.

347. Menthol ..... gr. x
Petrolati liq. ..... ℥ i
Glycerin ..... ℥ i
S.: Use with atomizer.

The remarks of the previous prescription apply to this one as well. Menthol is very soluble in liquid petrolatum, but liquid petrolatum is not soluble in or miscible with glycerin.

348. Pepsini ..... ʒ ij
Pancreatini ..... ʒ ij
Ac. Hydrochlor. dil. ..... ʒ iv
Syr. Zingib. ..... ℥ i
Aquae .....ad ℥ iv
S.: ʒ i after meals.

Pancreatin is considered to be absolutely incompatible with

hydrochloric acid or any other acids. Its activity is supposed to be destroyed. Pancreatin and pepsin in the same mixture are also supposed to be incompatible. But nevertheless many physicians are prescribing this combir ion, claiming they get good results from it and the pharmacist has no choice but to dispense it.

349. Piperazinae 25.0
Div. in pulv..... No. 25
S.: One powder in glass of water 5 times a day.

Piperazine is sometime quite hygroscopic and it is not advisable to dispense it in powder form. The proper way to dispense it is in solution.

350. Cocainae Hydrochlor. 0.6
Morphin. Sulph. 0.3
Atropin. Sulph. 0.02
Petrolati Albi 25.0
M.f. Ung. Apply after each defecation.

The alkaloidal salts may be dissolved in a very small quantity of water and the solution incorporated with the white petrolatum. It would be still better if the physician had prescribed the pure alkaloids, because the pure alkaloids are as a rule soluble in solid or liquid petrolatum, while their salts are not.

351. Phenol ..... gtt. xv
Arg. Nitr. ..... gr. v
Aquae..... ℥ v
S.: For external use.

The prescription is incompatible. The silver nitrate is reduced to silver oxide and metallic silver.

352. Salol ..... gr. v
Camphor ..... gr. ij
Antipyrin ..... gr. iij
M.f. pulv. No. 1. Tal. Dos. XL.

This is a well known incompatibility. A soft mass or a moist powder is the result.

353. Protargol ..... gr. xx
Plumbi Acet. ..... gr. xij
Argenti Nitratis ..... gr. v
Aq. Destill ..... ℥ v
To be used as injection.

Absolutely incompatible. Protargol is incompatible both with silver nitrate and with lead acetate, and lead acetate is also incompatible with silver nitrate.

354. Pyramidon ..... ʒ i
Spir. Aetheris Nitrosi ..... ʒ iv
Syr. Aurantii ..... ℥ i
Aquae .....ad ℥ ij
S.: ʒ ij every 4 hours.

The solution acquires a blue or violet color. What we said about the incompatibility of antipyrin with spirit of nitrous ether applies here as well. The compound formed may not be poisonous, most likely is not, but it is better not to prescribe pyramidon with spirit of nitrous ether.

355. Pyrogallol 25.0
Potass. Permang. 75.0
S.: ʒ i in basin of hot water for foot bath.

This prescription is absolutely incompatible. The pyrogallol is oxidized, the potassium permanganate is reduced.

356. Resorcini
Quinin. Bisulph. .....āā 0.2
In caps. gelat. No. 1. Tal. Dos. xx.

This prescription is all right. There is no objection to dispensing resorcin and quinine bisulphate in capsules, but the prescription would be incompatible if these two ingredients were ordered to be dispensed in solution, as then we would get a precipitate.

357. Aluminis ..... ℥ xij
Sodii Boratis ..... ℥ xvi
M. ft. pulvis
S.: ℥ ss in 2 quarts of water.

When powdered alum is rubbed with borax the mixture becomes moist due to the liberation of the water of crystallization. By mixing them gently this physical change may be prevented. The powder should be dispensed not in a paper box but in a wide-mouthed stoppered bottle. The really better thing would be to order the exsiccated alum instead of the ordinary powdered alum.

358. Sodii Perboratis ..... ℥ i
Aquae ..... ℥ xij
S.: For external use.

When sodium perborate is dissolved in water a chemical reaction takes place, hydrogen dioxide and sodium metaborate being formed. The prescription may be dispensed, because that is what the doctor generally wants—a freshly prepared solution of hydrogen dioxide.

359. Sol. Potass. Iod. Satur. ..... ℥ i
Sodii Thiosulphatis ..... gr. v
S.: gtt. x in milk t.i.d.

This prescription is seen frequently. The small quantity of sodium thiosulphate has no medicinal action. It is added for the purpose of preventing the liberation of iodine. A solution of potassium iodide if kept for any length of time sometimes gets brown, due to the setting free of small quantities of iodine. The sodium thiosulphate combines with any free iodine that may be present in the solution and the solution thus remains perfectly colorless. It is for the same reason that we sometimes add sodium thiosulphate to potassium iodide ointment.

360. Potassii Iodidi ..... ʒ ij
Sodii Iodidi ..... ʒ iij
Spir. Aether. Nitr. ..... ʒ vi
Ess. Pepsini ..... ℥ i
Aquae .....ad ℥ vi
S.: 3 i 3 times a day.

The change in the color of this mixture will depend a good

deal upon the purity of the iodides and the spirit of nitrous ether. As a rule it gets brown after a short time, due to the liberation of iodine from iodides by the nitrous ether.

361. Spir. Ammon. Arom. ..... ℥ ss
Sodii Brom. ..... ℥ ss
Syr. Aurantii ..... ℥ ss
Aquae ..... ℥ iij
S.: ℥ i as directed.

This mixture becomes milky-turbid, for two reasons. Both the sodium bromide and the water liberate the volatile oils from the aromatic spirit of ammonia.

362. Strychn. Hydrochlor. ..... ℥ i
Ac. Hydrochlor. Dil. ..... gr. i
Elix. Peptenzyme ..... ℥ i
Aquae .....ad ℥ iij
S.: ℥ i after meals.

This prescription is all right. Hydrochloric acid is said to give a precipitate with strychnine hydrochloride, but this is true only of the strong hydrochloric, not of the dilute acid.

363. Trional ..... gr. x
Chloral. Hydr. ..... gr. x
M.f. pulv. No. i. Tal. Dos. iii.
S.: One as required.

Trional and chloral hydrate when rubbed together form a soft mass.

364. Trional
Sulphonal
Urethane .....āā gr. v
For one powder. Take at once.

When trional and sulphonal and urethane are rubbed together, there is also a soft or semi-liquid mass. As the prescription calls, however, for one powder, to be taken at once, the ingredients may be put in wax paper without being mixed, and if taken at once there will be no trouble.

365. Sulphonal ..... gr. xv
Chloral. Hydrat. ..... gr. xx
M.f. pulv. 1. Tal. Dos. vi.
S.: Give one every hour until effective.

When sulphonal and hydrated chloral are rubbed together a soft or moist mass is obtained.

366. Agurin 15.0
Spartein. Sulph. 2.0
Strychnin. Sulph. 0.03
Syrupi 30.0
Aquae 200.0
S.: Tablespoonful every 2 hours.

Agurin, which is theobromine sodium acetate, is incompatible with alkaloids, which it generally precipitates. It is also improper to dispense agurin with syrup or sugar. They decompose it. The dose of sparteine in this prescription is also too large, practically two grains to the dose. While in emergencies we sometimes have to give very large doses of this alkaloid, still it is best to make sure that the physician meant what he wrote.

367. Diuretini ..... ℥ ij
Liquor. Ferri et Amm. Acet. ..... ℥ vi
Aquae Menthae Piper. ..... ℥ ij
S.: ℥ ss 4 times a day.

This prescription will acquire a violet color. Diuretin is theobromine sodium salicylate, and salicylates, we know, give a deep blue color with ferric salts.

368. Thymol ..... ℥ ij
Camphorae ..... ℥ iv
Ac. Carbolici ..... ℥ i
Ac. Borici ..... ℥ iv
S.: M.f. pulv. S.: Apply externally.

When thymol, camphor and carbolic acid are rubbed together a liquid mass is obtained. By powdering the first two

ingredients separately, mixing the phenol with the finely powdered boric acid and then mixing all the ingredients a serviceable powder may be obtained.

369. Thymolis Iodidi ..... ʒ ij
Amyli ..... ℥ i
S.: Apply externally.

It is stated that thymol iodide is incompatible with starch. It is claimed that some iodine may be liberated and combine with the starch to form iodide of starch. There is nothing to this criticism. First of all there is no liberation of iodine when the two are mixed, but even if there were no harm would be done. On the contrary it probably would be advantageous. For wherever thymol iodide is applicable, so-called iodide of starch is also applicable. So there is no harm in mixing thymol iodide and starch together.

370. Thymol. Iodid.
Calomel .....āā ʒ ij
Apply externally.

When kept for a long time, or thoroughly triturated, or in the presence of moisture, red mercuric iodide may be formed; but a little of it won't hurt. I have personally prescribed thymol iodide and calomel a number of times as an application to chancroids and only with good results.

371. Zinci Sulph. ..... gr. xij
Ac. Tannici ..... gr. xij
Aquae ..... ℥ vi
S.: Use as injection.

This prescription is all right. Generally speaking, tannic acid is incompatible with zinc sulphate, zinc tannate being precipitated. But this occurs only when the two chemicals are in concentrated solution. It does not take place when the chemicals are in dilute solution.

372. Potass. Permang. ..... .3 gm.
Thymol ..... .5 gm.
Alcohol ..... 5 mils.
Water to make .....100 mils.
Dissolve thymol in alcohol, permanganate in water and mix solutions.
S.: Tablespoonful to 2 quarts of tepid water for foot lotion.

This prescription was copied from a pharmaceutical journal which in its turn had copied it from *The Prescriber*. *The Prescriber* is such a careful, competent journal that one cannot help being surprised at seeing this prescription recommended in its pages. Potassium permanganate is incompatible with thymol and also incompatible with alcohol. After standing a while the potassium permanganate becomes completely reduced and worthless. The quantities are copied correctly, just as they appeared in the pharmaceutical journal. But to us they seem ridiculously small. Perhaps it is a typographical error and the author of the prescription meant 3 grams of potassium permanganate and 5 grams of thymol instead of 3 decigrams and 5 decigrams, respectively.

373. Ac. Salicylici ..... ʒ ij
Ac. Tannici ..... ʒ ij
Aluminis ..... ʒ ij
Kaolini ..... ʒ iv
M.f. pulv. S.: Foot powder. Shake into stockings every morning.

This prescription, as I happen to know, was prescribed for a very bad case of bromidrosis, that is, offensive sweating of the feet. The patient was told to put on every day a clean pair of socks, and preferably white socks, not colored ones. When the patient took off his socks the first night he was surprised and somewhat shocked to find both his feet and his socks dyed an inky black. The doctor was also surprised because he expected no such thing; he expected the powder to

be practically white or slightly grayish from the tannic acid and the kaolin. The trouble with this prescription is this: Kaolin usually contains some iron. Alum also now and then contains a small quantity of iron. Salicylic acid with iron as you know gives a deep violet color, while tannic acid gives a bluish black color. To make the reaction complete a little water is generally necessary, which was furnished by the perspiration of the feet. The powder itself also very soon acquired a black color.

374. Tr. Digitalis ..... ℥ ss
Tr. Strophanthi ..... ℥ ss
Sparteinae Sulph. ..... gr. xij
Strychn. Sulph. ..... gr. ij
Aquae .....ad ℥ iij
S.: Teaspoonful 4 times a day.

This prescription presents no incompatibility, either pharmaceutical or therapeutic. On the contrary from a therapeutic point of view, it is a "synergistic" prescription, that is, all the drugs act as cardiac tonics. But that is just the trouble with it. The dose of each ingredient separately, except perhaps of the sparteine, is not excessive, and may be administered without trouble. But the sum total of the amounts of these drugs, one fortifying the other, is excessive, and in this case the patient nearly died from one dose. It took several hours before he was brought out of danger.

375. Antikamnia
Antipyrin
Phenacetin
Acetanilid
Phenalgin..... each 5 grs.
Caffeine..... 2 grs.
For one powder. Make a dozen.
For neuralgia.

This prescription was given to a woman who suffered from extreme neuralgia and she came pretty nearly being rid of

all her troubles after the first powder. About ten minutes after taking the powder she became cyanotic, the people around her claimed that she was as black as ink, and it took considerable stimulation with black coffee, brandy, hot bottles, etc., before she was brought around.

376. Sol. Morphin. Sulph. ..... ℥ i
S.: 3 i as directed.

In this case, of which I have personal knowledge, the patient came very, very near losing his life. The druggist dispensed Magendie's solution, of which a teaspoonful was administered to the patient. Now as you well know, or perhaps not so well at the present time, there are two solutions of morphine. One contains only a grain to the ounce, while the other one, that is Magendie's solution, contains two grains to the dram. Of the old U. S. P. solution, which contains one grain of morphine sulphate to the ounce of water, a teaspoonful, containing one-eighth of a grain of morphine, is the proper dose. But of Magendie's solution, the proper dose is only four to eight minims, equivalent to one-eighth to one-quarter grain of morphine. A teaspoonful contains two grains, which is of course a fatal dose. It took a whole night's work, with potassium permanganate washings of the stomach, rectal injections of strong black coffee, etc., before death was forced to loosen her grip on the patient. It might be of interest to add that the patient, who was a very sick person, and to whom the morphine was prescribed to allay the pains of pleuro-pneumonia, began rapidly to improve after his strenuous night in which he hovered between life and death for several hours.

377. Hydrargyri Chlor. ..... gr. ¼
Saech. Lactis ..... gr. v
Pulv. No. 1. Tal. Dos. vi.
S.: One every hour.

The outcome in this prescription unfortunately was not so favorable It was made up by an unregistered drug clerk

who was very green in the business. He used one-quarter of a grain of corrosive sublimate to each powder. Now what the doctor wanted was one-quarter of a grain of calomel. Of course he should have written the prescription more carefully but any competent druggist would know what to dispense. One-quarter of a grain of mercuric chloride is not such a terribly big dose and may be given to adults without trouble. But it so happened that in this case the patient was a newborn infant, only about two weeks old, and it died very promptly after the first powder. The druggist was arrested, it cost him a big sum of money, and he is not entirely over his troubles yet.

378. Menthol ..... gr. x
Eucalyptol ..... min. xv
Zinci Sulph. ..... gr. x
Albolene liq. ..... ʒ ij
Use with atomizer.

This is an annoying but unfortunately too frequent prescription. The menthol and eucalyptol dissolve in the liquid albolene, but the zinc sulphate does not. No matter how finely you may powder it and incorporate it with the albolene, you cannot use it properly with an atomizer. It remains at the bottom. The doctor should be notified and advised to leave out the zinc sulphate or to prescribe it separately in an aqueous solution.

379. Menthol ..... gr. v
Sol. Adrenalini ..... ʒ ij
Pinoleum ..... ʒ vi
S.: Use as a spray.

The menthol dissolves in the pinoleum, but the solution of adrenalin, which is an aqueous solution, does not mix. The water and oil do not mix and it is a bad prescription to be dispensed to use in a spray.

380. Hydrargyri Chlor. Corr. ..... gr. ij
Pyrogallol ..... gr. xx
Petrolati ..... ℥ i
Adipis Lanae ..... ℥ ss
S.: Apply to scalp.

Pyrogallol and mercuric chloride are incompatible. Mercuric chloride is reduced and the pyrogallol is oxidized. Exposing the ointment to light and air also changes its color rapidly.

381. Cocaini Mur. 0.6
Camphorae 2.0
Chlorali Hydrat. 2.0
Apply to neuralgic spots.

The proper way to dispense this prescription is to use the pure alkaloidal cocaine instead of the cocaine hydrochloride. It might be added that cocaine applied externally to the unbroken skin is perfectly useless, because it is not absorbed. Cocaine exerts its anesthetic properties only on mucous membranes or where the skin is abraded.

382. Tr. Iodi ..... ʒ ij
Ext. Goulardi ..... ʒ vi
ʒ i to glass of water for external use.

We get here a yellow precipitate of lead iodide. Strictly speaking, the prescription should not be dispensed, but as it is for external use, and is not going to do any harm, it may be dispensed with a shake label.

383. Calx Chlorin. ..... ℥ i
Glycerini ..... ℥ i
Aquae ..... ℥ i
Apply full strength.

Chlorinated lime is incompatible with glycerin. By mixing the two directly an explosion *may* occur. A complex chemical reaction takes place in which the glycerin becomes oxidized by the chlorine to oxalic and, eventually, carbonic acid. By rubbing the chlorinated lime with the water into a smooth

mixture and then adding the glycerin, the violence of the reaction is lessened, but it is not entirely eliminated.

384. Massae Valleti ..... gr. v
Kali Carbonici ..... gr. v
Strychn. Sulph. ..... gr. 1/30
Ac. Arsenicosi ..... gr. 1/40
M.f. pil. No. 1. Tal. Dos. LX.
S.: One pill after meals.

The potassium carbonate here is entirely unnecessary. It only increases the bulk of the pill and by the deliquescent action is apt to spoil it. Physicians are used to prescribe ferrous sulphate and potassium carbonate so as to have freshly prepared ferrous carbonate. And it is probably more a matter of habit than of actual necessity that the potassium carbonate was ordered in this prescription.

385. Europhen 15.0
Amyli 45.0
Apply externally to ulcer.

Europhen is stated to be incompatible with starch because a little iodine may be liberated from the former which would combine with the latter to form iodide of starch. As stated in commenting upon another similar prescription, even if that were the case no harm would result. The so-called iodide of starch makes a very good vulnerary application. The prescription may be dispensed without any question.

386. Iocamfen ..... ʒ i
Aquae ..... ʒ iii
S.: Apply externally on gauze.

Iocamfen is not miscible with water and the prescription should not be dispensed. The proper method of using iocamfen is either pure or mixed with oil.

387. Europhen ..... 3 i
Ung. Aquae Rosae ..... ʒ i

The borax contained in the cold cream may liberate a small

amount of iodine from the europhen. No great harm will result if it does.

388. Airol ..... ʒ i
Calomel ..... ʒ ss
Aquae Calcis ..... ℥ iii
For external use.

Airol and calomel in the presence of moisture or water do not form a desirable combination, because some of the iodine from the airol may combine with the calomel to form red mercuric iodide. In this prescription there is another well known incompatibility, namely, the black mercurous oxide is formed from the action of the lime water on the calomel.

389. Ess. Pepsini ..... ℥ i
Ac. Hydrochlor. Dil. ..... ʒ ii
Magma Magnesiae q.s. ad..... ℥ iii
S.: ʒ ii after meals.

This prescription is absolutely incompatible. The hydrochloric acid destroys the magnesia, converting it into magnesium chloride. This is one incompatibility. The other incompatibility is between the magma magnesia and the essence of pepsin. Pepsin, as we know, is efficient or said to be efficient only in an acid medium. So if we leave out the hydrochloric acid the activity of the pepsin will be inhibited. If we leave in the hydrochloric acid the magma of magnesia is destroyed. The honest way to do is to inform the physician. Where it cannot be done the prescription may be dispensed, because of course there is nothing poisonous in it.

390. Aspirin ..... 1 drachm.
Sodium salicylate ..... ½ drachm.
Phenacetine ..... ½ drachm.
Caffeine citrate ..... 10 grains.
Ammonium muriate
Ammonium bromide .....āā 1½ drachms.
Chloral hydrate ..... 1 drachm.
Codeine sulphate ..... 4 grains.

Tincture aconite,
Tincture gelsemium,
Tincture hyoscyamus,
Tincture digitalis, fat-free.....āā 1 drachm.
Syrup glycyr. compound.....q.s. 4 ounces.
Directions: Two teaspoonfuls in water every four hours.

This prescription, which is strictly bona fide and which appeared in a recent issue of the Bulletin of Pharmacy, is presented here merely as a curious example of polypharmacy, which was once very prevalent but which is now luckily almost, though not entirely, obsolete. Now and then we still see such a prescription in a drug store, and as the doctor claims that he gets wonderful results from it, there is nothing left to do but to dispense it.

391. Santonini ..... gr. xx
Calomel ..... gr. viii
Saccharī ..... gr. xxx
Div. in pulv. No. iii.
One powder in the morning.

This prescription is presented here merely for the overdose of santonin which it contains. While we may often exceed the maximum dose given in the Pharmacopeia and in textbooks on materia medica and therapeutics, still there is a limit, and where there is the least doubt it is better to be on the safe side. Here the druggist very wisely refused to dispense the prescription because he considered seven grains of santonin to a dose too risky. He telephoned to the physician, and the latter apologized, saying that he meant to have the quantities divided into eight instead of three powders, but evidently he left out the Roman V. Divided into eight powders the prescription is all right, because the dose of santonin is then 2½ grains, which is not an excessive dose.

392. Helmitol ..... ℥ i
Potassii Bicarbon. ..... ℥ ss
Liq. Potassae ..... ʒ i
Fl. Ext. Buchu..... ℥ i
Fl. Ext. Uvae Ursi..... ℥ ss
Aquae .....ad ℥ vi
S.: ʒ i four times a day.

Helmitol is chemically hexamethylenamine-methylene citrate, and it is incompatible with alkalies as it is incompatible with acids. As this prescription contains two alkalies, potassium bicarbonate and potassium hydroxide, the prescription is an incompatible one. The proper thing is to notify the physician. The incompatibility is not a dangerous one, and if the physician cannot be reached the prescription may be dispensed as written. True, the helmitol is decomposed, but the hexamethylenamine-tetramine is left. The patient may not derive very much benefit from the prescription, but what is the druggist to do? As long as nothing dangerous happens, nothing particularly toxic, and he is unable to reach the physician and have him change the prescription, he has no other way out.

393. Saliformin ..... ℥ ss
Aquae..... ℥ iii
S.: ʒ i four times a day.

Saliformin is chemically hexamethylenamine salicylate. It is not good to prescribe it in water because it hydrolizes in water into its constituents. The proper way to prescribe it is either in tablets or dissolved in some elixir.

394. Pepsini Optimi ..... ʒ i
Betainae Hydrochlor. ..... ʒ iii
Aquae..... ℥ iii
S.: ʒ i after meals.

This prescription is "perfectly all right." But the druggist who received it refused to dispense it. He thought that the

dose of betaine was excessive, and the reason he thought it was excessive was that he thought it was an alkaloid. And the reason he thought it was an alkaloid was that he confused it with and thought it was the same thing as betaeucain. Betaine is a colorless crystalline substance, containing about 24 per cent. of absolute hydrochloric acid and is used in various digestive disorders as a substitute for hydrochloric acid. Its average dose is eight grains, which corresponds to about eight minims of diluted hydrochloric acid. And the dose in this prescription is just right. Betaine is also known under its trade name Acidol.

395. Chlorazene ..... ℥ ii
Ac. Borici ..... ʒ ss
Aquae ..... Oii
S.: Use externally as directed.

Chlorazene, which is a trade name for dichloramine-T is incompatible with acids, even with such a weak acid as boric acid. And we might use this opportunity to state that in prescribing new remedies physicians should be particularly careful not to order them in conjunction with other substances. It is only if they are thoroughly familiar with all their possible incompatibilities, something which is not likely to be the case with the average physician, may they indulge in experimenting; otherwise they should prescribe them by themselves or just the way the authoritative textbooks advise.

396. Chloramine-T ..... ℥ i
Hydrogen Peroxide ..... ʒ ii
Listerine ..... ʒ ii
For external use only.

The remarks of the previous prescription apply to this one as well. Why a physician who has a powerful antiseptic should want to combine it with several others is hard to understand, but such is human nature. Chloramine-T is incompatible with hydrogen peroxide, with alcohol and with a number of other substances.

397. Halazone Tablets .....āā gr. v No. xxx
S.: One tablet in 2 quarts of water as a douche.

Undoubtedly the physician in this case was mixed up. He heard or read that halazone was a powerful antiseptic or disinfectant and thought he would use it for medicinal purposes. Halazone is used only for the sterilization of water and appears on the market in tablets containing 1-15 or 1-30 of a grain. The tablets usually contain also some sodium carbonate or borax and sodium chloride. One tablet containing 1-15 to 1-30 of a grain of halazone is used for the sterilization of one quart of water.

398. Hydrargyri Salicyl ..... gr. iv
Potassii Iodidi ..... ʒ iv
Aquae..... ℥ iii
S.: ʒ i four times a day.

The physician who prescribed this prescription most likely thought that salicylate of mercury was soluble in water. Salicylate of mercury is practically insoluble in water and to dispense it the way it is written would be risky, because some of it might remain undissolved and it would be difficult to have the patient take an even dose. Mercury salicylate, however, is soluble in the halogen compounds of the alkalies particularly when the solution is warmed. The proper way would be to dissolve the potassium iodide in the water, heat the solution and then dissolve the mercury salicylate in the warmed solution.

399. Salophen ..... ʒ i
Natrii Bicarb. ..... ʒ ss
Div. in pulv. No. vi.

Salophen is incompatible with alkalies in solution. But as this prescription calls for powders it is not incompatible and may be dispensed.

400. Hexamethylenaminae ..... ʒ iv
Sodii Acidi Phosphatis, N. N. R..... ℥ i
Aquae..... ℥ iii
S.: ʒ i three times a day.

As is well known, hexamethylenamine acts best when the urine is acid. And the best drug to make the urine acid is the acid sodium phosphate as described in the New and Non-Official Remedies; not the official sodium phosphate, which is chemically Na_2HPO_4 but the acid phosphate or biphosphate, which is chemically NaH_2PO_4. But it is not advisable to prescribe the two in the same mixture. The acid sodium phosphate should be administered separately. It is not a chemical or pharmaceutical incompatibility and the druggist has no right to refuse to dispense this prescription; but it is best the physician should know.

Those who think that "shot-gun" polypharmacy has gone entirely out of the fashion, may be somewhat shocked by contemplating the following prescription, written by a real live physician and reproduced in the *Journal of the American Medical Association*. Here it is:

401. ℞. Merck's Colchicin
" Strychn. Phos. .....āā grs. ii
" Sod. iodid.
" Sod. salicyl. .....āā 3 x
Tr. Belladonna
" Bryonia alb. .....āā 3 ii
" Capsicum. ..... 3 i
" Arnica mont.
" Pulsatilla
" Rhus tox. .....āā 3 v
" Phytolocca ..... 3 x
" Cimicif. Rac.
" Colchicum. .....āā 3 xv
Reed and Carnrick's Elix. Peptenzyme. 3 x
M. S.: Take sixty (60) minims (drops) in a glassful of water, an hour after each meal. Take every 2 hours if very severe.

We do not say that it did not do the patient any good (or harm), but it is a curiosity, anyway.

The following prescription is taken from the *Journal of the N. A. R. D.* (January 8, 1914):

"From an Illinois pharmacist comes the following breezy note:

A country physician moved into our city to build up a practice. He knew me and we got quite chummy, and I told him that in order to be up to date he must write prescriptions and not do dispensing.

He agreed, but said he did not know prescription forms, as he had never written one; so I told him to write the best he could and I would make out what he wanted, all right. The first prescription was as follows, and I have it on file in its regular order:

402. Quinine .....a little
Strichnine .....not so much
Iron .....a little more
Make some capsules; take one every three hours.

And the editor says:

Comment is hardly necessary, only it shows, probably better than anything could, the looseness and criminal carelessness displayed in the average dispensing doctor's office."

This is either a joke or a fib, or it is true. If it is a joke, it is in poor taste. If it is a fib, it is an insult to the medical profession. If it is true, it is a shame that such physicians should exist.

But assuming that it *is* true that such physicians do exist, what is the moral of it? The moral is plainly and distinctly and indisputably this: that physicians of such type, who are so incompetent to write a prescription, *should not* write prescriptions *but should dispense ready made preparations* from reputable manufacturing houses. I repeat, such physicians should not exist, and it is a shame that they should be permitted to practice, but it is a condition and not a theory that confronts us, and if such physicians do exist and they are permitted to treat patients, *is it not better for the patients* that they should dispense than to attempt to write prescrip-

tions when they do not know the doses and are not familiar with chemical and pharmaceutical incompatibilities? There is a very good reason for the vogue of good ethical proprietary preparations, and all the diatribes against dispensing by the physician, or against his prescribing of well thought-out, skillfully prepared proprietary pharmaceuticals will be in vain.

I present the following three prescriptions as specimens of herb recipes. They were written by an old herb doctor with an enormous practice. They were given to me by one of my patients whom that doctor had "treated" for over a year for impotence with these combinations. Practically every patient received the same prescriptions.

403.

Spanish Sarsaparilla	½ oz.
Yellow Dock Root	½ oz.
Skunk Cabbage Root	¼ oz.
Buchu	¼ oz.
Rhubarb Root	¼ oz.
Scullcap	¼ oz.
Licorice Root	¼ oz.
Senna	⅛ oz.
Blood Root	⅛ oz.
Anise Seeds	⅛ oz.

Steep these in sufficient hot water for 3 hours to have 3 pints of tea when strained. Add when cold 3 oz. Rye Whiskey. Dose 2½ tablespoonfuls 3 times a day, 15 minutes before meals or one hour after.

404.

Nerve Root	¼ oz.
Mountain Ash Bark	¼ oz.
Cleavers	¼ oz.
Rhubarb Root	¼ oz.
Elecampane Root	¼ oz.
White Root	¼ oz.
Licorice Root	¼ oz.
Scullcap	¼ oz.
Anise Seeds	⅛ oz.
White Ginger Root	⅛ oz.

Steep these in sufficient hot water for 3 hours to have 3 pints of tea when strained. Add when cold 3 oz. Rye Whiskey. Dose 3 tablespoonfuls 3 times a day, 15 minutes before meals or one hour after.

405. Blue Scullcap ..... ¼ oz.
Mountain Ash Bark ..... ¼ oz.
Princes Pine ..... ¼ oz.
Sweet Flag Root ..... ¼ oz.
Culver's Root ..... ¼ oz.
Snakehead Herb ..... ¼ oz.
Marshmallows ..... ¼ oz.
Rhubarb Root ..... ¼ oz.
Senna ..... ⅛ oz.
White Ginger Root ..... ⅛ oz.

Steep these in sufficient hot water for 3 hours to have 3 pints of tea when strained. Add when cold 3 oz. Rye Whiskey. Dose 3 tablespoonfuls 3 times a day, 15 minutes before meals or one hour after. Rest 4 days, then renew one before this, rest 6 days and renew this one.

Note that Rye Whiskey was an ingredient in each one of his prescriptions.

406 Caffein. Citratis ..... 3 ii
Sodii Salicylatis ..... 3 iv
Aqua Destill. ..... ℥ iv
S.: 3 i every 3 hours.

This prescription forms a precipitate; and this precipitate has puzzled many pharmacists. Caffeine citrate is soluble in water, sodium salicylate is soluble in water, and if the radicals are exchanged the salts formed are still soluble, i. e., caffeine salicylate is soluble and sodium citrate is soluble—so why should there be a precipitate? The explanation is a very simple one. Caffeine "citrate" is not a true chemical compound, and for this reason it is called officially not caffeine citrate but *citrated* caffeine. It is really a mixture of equal parts of caffeine and citric acid. Now, the citric acid

being free, it decomposes the sodium salicylate with the formation of sodium citrate and salicylic acid, which latter, being but slightly soluble in water, precipitates. This incompatibility can be easily avoided by using an equivalent quantity, which means just one-half, of pure caffeine.

407. Iodi ..... gr. x
Potassii Iodidi ..... ʒ i
Argyrol ..... ʒ i
Aqua Destill. ..... ℥ ii
Use for painting throat.

This prescription is absolutely incompatible. The argyrol is destroyed, silver iodide being formed. Silver iodide is therapeutically active, in fact sometimes too active, but that does not change the fact that the prescription must not be dispensed, because we no longer have argyrol in it. The physician's attention should be called to the incompatibility, and if he still wishes to have the prescription dispensed as written, it is his affair.

408. Resorcini ..... gr. xv
Petrolati Liquidi ..... ʒ i
M.f. sol. Use externally.

Resorcin not being soluble in liquid petrolatum, it can be rubbed up and dispensed as a shake mixture. But a much better way is to dissolve the resorcin in a few drops of ether and then mix with the petrolatum.

409. Resorcini ..... ʒ ii
Glycerini ..... ℥ ii
Apply externally with camel's hair brush.

There is nothing whatever wrong with this prescription. One druggist refused to dispense it, saying that the two were incompatible and also that resorcin was not soluble in glycerin. There must have been some misunderstanding. Resorcin is perfectly soluble in glycerin and perfectly compatible with it.

410. Strontii Bromidi ..... ℥ iii
Sodii Bicarbon. ..... ℥ ii
Mist. Rhei et Sodae ..... ℥ iv
S.: Tablespoonful after each meal.

This prescription gives not only a precipitate but a copious effervescence. The precipitate is due to the formation of strontium carbonate. And where a soluble carbonate is used in combination with a soluble strontium salt that is all we get. But where a bicarbonate is used, we get also, besides the precipitate, an evolution of carbon dioxide which causes the effervescence. The following equation expresses the chemical reaction:

$$SrBr_2 + 2\ NaHCO_3 = SrCO_3 + 2\ NaBr + CO_2 + H_2O$$

If the doctor insists upon the prescription being dispensed it may be dispensed, but it should not be put in the bottle until all the formation of gas has ceased, and the bottle in which it is put should be of larger capacity than the prescription calls for. Of course it should be dispensed with a shake label.

411. Protargol ..... gr. x
Cocain. Hydrochlor. ..... gr. vi
Aqua Destill. ..... ℥ iii
For injection.

Here we will get gradually a white precipitate of silver chloride due to the interaction between the chloride of the Cocaine and the silver of the protargol. But the trouble can be easily prevented by using cocaine nitrate instead of cocaine hydrochloride.

412. Acidi Sulphurosi ..... ℥ ii
Aqua Hydrogenii Peroxidi ..... ℥ ii
Use as a gargle.

Each of the two ingredients is antiseptic, but when the two are mixed both are destroyed and a very weak solution of sulphuric acid is obtained. The reaction is expressed in the following equation:

$$H_2SO_3 + H_2O_2 = H_2SO_4 + H_2O$$

This prescription is another example of trying to get too much and of getting nothing.

413. Quininae Sulph. ..... gr. iii
Aspirini ..... gr. v
M. f. caps. No. 1. Tal. Dos. vi.
S.: One capsule every 5 hours.

For some time the pharmaceutical journals carried the "important" information that quinine was incompatible with aspirin, because a very dangerous poisonous compound, quinotoxin, was formed, from which many deaths resulted. I put no credence in those reports at that time, and I do not now. As far as I know, the two chemicals are perfectly compatible. I have prescribed them and have seen them prescribed without any bad results.

414. I. Tr. Iodi ..... ℥ iv
S.: Two teaspoonfuls to quart of water.
II. Tab. Hydr. Bichlor.....āā 0.5, No. xii
So.: One in 2 quarts of water as directed.

The young lady patient was ordered to use the two douches immediately following one another. She did so and experienced a severe burning which lasted for over an hour. She was ordered to use these douches morning and night and, in spite of the severe burning produced by the first injection, she continued to use them for three or four days until the soreness and pain became unendurable. When she applied to another doctor for treatment he found the entire vaginal mucous membrane in a state of severe inflammation and so sensitive that the introduction of a speculum caused excruciating pain.

The physician who had prescribed those douches with the best of intentions was evidently not aware of the fact, or it had slipped his mind, that iodine and mercuric chloride produce mercuric iodide, which is extremely irritating. When douches of iodine and of bichloride are ordered they must

not follow each other too closely. Or a douche of plain water should be used after the iodine douche or after the bichloride douche so as to remove the chemical from the vaginal canal and to prevent the formation of mercuric iodide.

415. Argenti Nitr. 0.05
M. f. pil. No. 1. Tal. Dos. ecl.
S.: Pil. un. q. in die.

I reproduce the above prescription, which I dispensed dozens and dozens of times. The patient took several thousands of these pills with the result that his face became dark, then black in streaks, and finally assumed the color of a negro's; only it was not uniform, which made the case worse. Even while he was getting black he kept on taking the pills, neither he nor the physician assuming a causal relationship between the pills and the "turning negro." It was one of the severest cases of argyria that I have ever seen. When the patient finally discovered that his black color was not due to his disease, but to the medicine he sued the physician for damages. The patient was suffering with locomotor ataxia, and at that time silver nitrate was still considered a remedy for this disease. Before the case came to trial, however, the patient died and the case was dropped.

416. Pepsin
Pancreatin
Taka Diastase
Lactopeptine
Ac. Hydrochlor. Dil.....each 2 dr.
Mist. Rhei et Sodae..... 2 oz.
Ext. Cascara Fl. ..... 2 oz.
Elixir Peptenzyme ..... 1 oz.
Ess. Pepsin Fairchild ..... 3 oz.
S.: Tablespoonful after each meal.

No prescription can demonstrate better the difference between incompatibility and non-dispensability than the pre-

scription before us. That prescription is certainly incompatible, incompatible chemically, pharmaceutically and therapeutically. Nevertheless the physician insisted on having it dispensed just as written and said that if this drugstore did not dispense it as he wanted it, he would go somewhere else. He claimed that he got first-class results with it in the worst cases of dyspepsia, that his patients were satisfied, and that it was not the druggist's business to teach him or to make remarks about his prescriptions. And what are you going to do about it? You simply have to dispense it. As I said many times before, as long as there are no overdoses, no toxic precipitates, no danger of explosion, no irreparable deliquescence, and the mixture is presentable enough and fluid enough to be poured from the bottle, and the doctor insists upon having it dispensed as written, the pharmacist has no choice in the matter. After all, he is the servant and not the master of the physician.

417. Sol. Fowleri 4.0
Syr. Ferri Iodidi 100.0
S.: Teaspoonful in water 3 times a day after meals.

This prescription has been dispensed times without number. The principal trouble is with the carbonate of potassium contained in the solution of potassium arsenite, which precipitates the iron as ferrous carbonate. Most likely some ferrous arsenite is also formed gradually. The precipitation can be avoided by using the solution of arsenous acid which is of the same strength as the solution of potassium arsenite.

418. Tr. Nucis Vomicae ..... ʒ iv
Tr. Gentianae Compos. ..... ʒ i
Aquae Menthae Piper..... ʒ iii
Sig.: ʒ i t. i. d. p. c.

The turbidity in this prescription is due to the fat contained in the nux vomica which is kept in solution in the alcoholic menstruum of the tincture of nux vomica, separating on the tincture being mixed with a hydro-alcoholic and

aqueous menstruum. Of course the prescription may be dispensed as written.

419.	Bismuthi Salicyl.	15.0
	Ac. Hydrochlor. Dil.	10.0
	Ess. Pepsini	25.0
	Aquae	100.0

S.: Tablespoonful after meal.

Hydrochloric acid is incompatible with bismuth salicylate (the official salicylate of bismuth is not a true salicylate but a subsalicylate); a part of the bismuth is decomposed, bismuth chloride and then oxychloride being formed and salicylic acid separating out and floating in the mixture. The prescription may be dispensed, but it is a bad one.

420.	Bismuth. Salicyl.	℥ i
	Natrii Bicarbon.	ʒ ii
	Mist. Rhei et Sodae	℥ ii
	Aquae Creosoti	℥ iv

S.: ℥ ss ter in die post cibos.

Sodium bicarbonate and bismuth salicylate in an aqueous mixture will gradually develop carbon dioxide, which will either cause the popping out of the cork or bursting of the bottle. Sodium bicarbonate or potassium bicarbonate will do this with a number of salicylates, such as bismuth salicylate, lithium salicylate, or magnesium salicylate. The products of decomposition that are formed by sodium salicylate are bismuth hydrocarbonate, carbon dioxide and water. Carbonates do not cause an evolution of carbon dioxide, only bicarbonates.

PRESCRIPTIONS WITHOUT CRITICISM

The following prescriptions are presented without any criticism. Similar combinations have been analyzed in the preceding pages, and the student, pharmacist or physician can test his knowledge of incompatibilities by attempting, now and then, to criticize some of the prescriptions. Where

there is doubt or uncertainty in the reader's mind, a reference to the Alphabetical Summary or the Index should help to solve the difficulty.

421. Tr. Iodi ..... ℥ ii
Argenti Nitr. ..... gr. x
Aquae ..... ℥ ii
S.: Gtt. x in water 4 times a day.

422. Sol. Adrenalini Chlor. ..... ℥ ss
Petrolati Liq. ..... ℥ ii
S.: Use as spray.

423. Tr. Iodi ..... ℥ iv
Aq. Ammon. Fort. ..... ℥ iv
Linim. Chloroformi ..... ℥ iv
S.: Use with friction.

424. Ac. Tannici ..... ℥ i
Aq. Hydrog. Perox. ..... ℥ iv
Use as gargle.

425. Argenti Nitrici 0.3
Sol. Arsenic. Fowleri 5.0
Aquae 150.0
S.: ℥ i after each meal.

426. Dobell's Solution ..... ½ pint
Dioxogen ..... ½ pint
S.: For external use.

427. Zinci Chloridi ..... ℥ ii
Aquae ..... ℥ iv
S.: Use as injection twice a day.

428. Zinci Oxidi ..... gr. ii
Aquae Destill. ..... ℥ iv
S.: Use as injection 4 times a day.

429. Resorcin 1.0
Bism. Subnitr. 4.0
Zinci Oxidi 6.0
M. f. ung.
S.: Apply night and morning.

430. Hepar Sulphuris ..... ℥ ii
Zinci Sulphatis ..... ℥ ss
Plumbi Acetatis ..... ℥ ss
Aquae Rosae ..... ℨ vi
S.: For external use.

431. Lysol ..... ℨ iii
S.: 5 i 3 times a day.

432. Argenti Nitratis ..... gr. v
Glycothymoline ..... ℨ iv
S.: For external use only.

433. Sol. Argenti Nitr., 10% ..... ℨ iv
S.: One syringeful 3 times a day.

434. Quin. Sulph. ..... ℥ i
Sodii Salicyl. ..... ℥ iii
Ac. Sulphur. Arom. ..... ℥ i
Elix. Glycyrrhiz. ..... ℨ i
Aquae ..... ℨ ii
S.: 3 i every 4 hours.

435. Sol. Ac. Carbolici, 10% ..... ℨ vi
S.: Poison! Apply externally.

436. Potass. Permangan. ..... ℥ i
Ac. Phenyl. ..... ℥ ii
Aquae ..... ℨ vi
S.: For external use only!

437. Peroxide
Carbolic Acid,.....of each, proper quantity
To be used as ordered.

438. Ol. Palmae Christi ..... ℨ i
Ol. Menthae ..... gtt. ii
S.: Take at one dose.

439. Zinci Chloridi ..... ℥ ii
Aquae ..... ℨ iv
S.: Use externally as directed.

440. Ung. Iodi ..... ℥ i
Ung. Hydrargyri ..... ℥ i
S.: Apply 3 times a day.

441. Chlorali Hydr. ..... ʒ iii
Potassii Brom. ..... ʒ iv
Aquae ..... ℥ ii
S.: Tablespoonful at night.

442. Chlorali Hydrati ..... ʒ iv
Potassii Brom. ..... ʒ iii
Sodii Brom. ..... ʒ vi
Elix. Simpl. ..... ℥ ii
S.: One teaspoon at night. May be repeated in an hour if not effective.

443. Quin. Sulphat. ..... gr. iii
Sodii Salicyl. ..... gr. v
M. f. pulv. 1. Make such powders xxiv.
S.: One powder 4 times a day.

444. Quin. Sulph. ..... ʒ i
Sodii Salicyl. ..... ʒ iii
Elix. Glycyrrhiz. ..... ℥ i
Aquae ..... ℥ ii
S.: ʒ i every 4 hours.

445. Sol. Acidi Borici, 10% .....O i
S.: Apply on compresses.

446. Ammonii Carbon. ..... gr. v
Ammonii Chloridi ..... gr. ii
Hydrarg. Chloridi ..... gr. 1/10
For one caps. Make 12 capsules.
S.: One 3 times a day.

447. Ac. Pierici
Aquae
S.: For external use. *Rush!*

448. Tr. Iodi 10.0
Sol. Corr. Sublim. 1-1000 ..... 100.0
S. For external use only.

449. Acetphenetidini ..... 3 i
Antipyrini ..... 3 i
Spir. Aetheris Nitr. ..... ℥ i
Liq. Amm. Anis. ..... 3 ii
Aquae, q. s. ad..... ℥ iv

450. Gran. Aconitinae .....āā gr. 1/20
No. xx

S.: One every ½ hour.

451. Tr. Ferri Chloridi ..... ℥ i
Tr. Cantharidis ..... 3 i
S.: Gtt. xii ter in die.

452. Sol. Potass. Chlor., 10% ..... ℥ viii
S.: Use as gargle.

453. Ac. Carbol. ..... 3 i
Collodion ..... 3 iii
S.: Paint with camel's hair brush *around* boil.

454. Hydrarg. Biehlor. ..... gr. iv
Sol. Potass. Permang., 25%..... ℥ iv
S.: Apply externally as directed.

455. Atropinae Sulph. ..... gr. iii
Ol. Olivae ..... 3 iv
S.: Caution! Apply small quantity every hour until pain is relieved.

456. Atropinae Sulph. ..... gr. iv
Aquae Destill. ..... ℥ iv
S.: 3 i 3 times a day.

457. Hydrarg. Chlor. Corros..... gr. iv
Syr. Hypophosph. Comp. ..... ℥ ii
Aquae ..... ℥ i
Elixir. Simpl. ..... ℥ i
S.: 3 i t. i. d. p. c.

458. Potassii Iodidi ..... 3 ii
" Brom. ..... 3 iii
Sodii Iodidi ..... 3 ii
" Brom. ..... 3 iii

Tr. Ferri Sesquichlor. ..... ℥ i
Aquae, q. s. ad..... ℥ viii
S.: 3 i 4 times a day.

459. Aquae Destillatae, U. S. P..... 1000.0
Recente paratae, sterilizatae!
S.: Pro usu doctoris.

460. Quin. Sulphat. ..... ʒ ii
Ac. Sulph. Dil., q. s.
Tr. Ferri Chloridi ..... ʒ iv
Syrupi ..... ℥ i
Aquae ..... ℥ iii
S.: 3 i ter in die.

461. Antipyrini ..... ʒ ii
Aquae Destill. ..... ℥ i
S.: For external use!

462. Hydrargyri Bichlor. ..... gr. iv
Potassii Iodidi ..... ʒ ii
Argenti Nitratis ..... gr. viii
Aquae ..... ℥ iv
S.: 3 i 3 times a day.

463. Phenol (100%) .....ʒ i
S.: For external use.

464. Ichthyol ..... ʒ i
Creosoti ..... ʒ ss
Guaiacol ..... ʒ i
Div. in caps. No. xxx.
S.: Two capsules 3 times a day.

465. Hydrarg. Chlor. Mitis..... ʒ ii
Ung. Iodi ..... ʒ vi
M. f. ung.
S.: Apply with friction 3 times a day.

466. Sol. Magendie ..... ʒ i
Tr. Lavand. Comp. ..... ʒ iii
Aquam, q. s. ad..... ℥ ii
S.: 3 i pro re nata.

467. Sol. Magendie ..... gr. iv.
S.: Gtt. viii as required.

468. Potassii Iodidi ..... ℥ ss
Syr. Ferri Iodidi ..... ℥ iii
S.: 3 i in water 3 times a day.

469. Potass. Permang. ..... ʒ i
Glycerini ..... ℥ i
Aquae ..... ℥ iii
S.: For external application.

470. Sodii Salicyl. ..... ʒ ii
Spir. Aetheris Nitr. ..... ℥ i
Ammon. Carbon. ..... ʒ i
Aquae ..... ℥ iii

471. Ac. Arsenosi 0.06
Strychn. Sulph. 0.06
Quin. Sulph. 0.6
Massae Ferri Carbon. 6.0
Div. in pil. No. xxx.
S.: One 3 times a day.

472. Chlorali Hydrati ..... gr. v
Ol. Theobrom. ..... gr. xx
M. f. suppos. No. i. Tal. Dos. viii.
S.: Insert *two* suppositories at night, one after the other.

473. Pil. Hydrarg. Chlor. ..... gr. ⅛
No. xxx
S.: One t. i. d. after meals.

474. Sulphuris ..... ʒ ii
Bals. Peruv. ..... ℥ ss
Petrolati ..... ℥ i
S.: Rub on at night.

475. Sulphuris ..... ʒ ii
Bals. Peruv. ..... ℥ ss
Adipis ..... ℥ i
M. f. ung.
S.: Apply at night.

476. Emulsionis Olei Morrhuae, 50%
Spir. Frumenti .....āā ℥ viii
S. ℥ ss after meals.

477. Oleores. Cubebae ..... ʒ iv
Fl. Ext. Buchu ..... ʒ vi
Ol. Santali ..... ʒ ii
Aquae ..... ℥ iv
S.: ʒ i 3 times a day.

478. Hydrargyri Sublim. ..... gr. ii
Potassii Iodidi ..... ʒ ii
Ac. Nitrohydrochlor. ..... ʒ ii
Ess. Pepsini ..... ℥ i
Aquae ..... ℥ ii
S.: ʒ i ter in die after meals.

479. Trional ..... gr. v
Veronal ..... gr. x
Medinal ..... gr. v
Ft. pulv. 1. Tal. Dos. vi.
S.: One on retiring.

480. Morph. Sulph. ..... gr. ii
Heroini ..... gr. ii
Dionini ..... gr. ii
Codeinae ..... gr. vi
Ammon. Mur. ..... ʒ iss
Syr. Tolut. ..... ℥ i
Aquae, q. s. ad..... ℥ ii
S.: ʒ i 3 times a day.

481. Tr. Ferri Chlor. ..... ʒ iv
Potass. Chloratis ..... ʒ iv
Glycer. Ac. Tannici ..... ℥ i
S.: ʒ i in water for gargling.

482. Pilocarpinae Nitr. ..... ʒ ij
Bay Rum ..... ℥ viij
S.: To be used on scalp night and morning.

483. Potassii Brom. ..... ℥ i
Sodii Brom. ..... ℥ i
Ammonii Brom. ..... ℥ ss
Calcii Brom. ..... ℥ ss
Strontii Brom. ..... ℥ ss
Potassii Acetatis ..... ℥ i
Sodii Citratis ..... ℥ i
Lithii Citratis ..... ℥ i
Aquae, q. s. ..... ℥ xxij
S.: ℥ ss in glass of water on rising and on going to bed.

484. Ichthyol, pure ..... ℥iv (!)
S.: Teaspoonful 3 times a day after each meal.

485. Tabloids Three Bromides B. W. and Co. No. C.
S.: Three tablets in glass of water 4 times a day.

486. Iodi ..... ʒ i
Adipis Lanae ..... ℥ i
M. f. ung.
S. Apply externally night and morning.

487. Zinci Sulphatis ..... gr. v
Mellis Boracis ..... ℥ ii
S.: Use externally with swab.

488. Creosotal ..... ʒ i
Guaiacol ..... ʒ i
Ol. Amygd. Express. ..... ʒ ii
Ol. Amygd. Amar. ..... gtt. v
Div. in caps. No. xxx.
S.: Two capsules 3 times a day.

489. Arseni Trioxidi ..... gr. 1/30
Hydrarg. Bichlor. ..... gr. 1/16
Quin. Sulph. ..... gr. i
Massae Ferri Carbon. ..... gr. iii
M. f. pil. No. 1. Tales Doses xl.
S.: One pill 3 times a day after meals.

490. Sol. Potass. Arsen. ..... ℥ iij
Hydrarg. Bichlor. ..... gr. v
Quin. Sulph. ..... gr. xl
Tr. Ferri Chloridi ..... ℥ vi
Aquae, q. s. ad..... ℥ v
S.: ℥ i ter in die p. c.

491. Tr. Cinchonae ..... ℥ i
Tr. Ferri Chloridi ..... ℥ i
Tr. Cantharidis ..... ℥ ii
S.: Gtt. xv t. i. d. in Vichy Water.

492. Airol ..... ℥ iv
Aquae ..... ℥ iv
S.: Use as injection.

493. Ammon. Benz..... ℥ i
Sodii Benz. ..... ℥ iii
Ac. Hydrochlor. Dil. ..... ℥ ii
Ess. Pepsini ..... ℥ ss
Aquae ..... ℥ iij
S.: ℥ ii after meals.

494. Quin. Sulph. ..... ℥ ii
Tr. Digitalis ..... ℥ iv
Liq. Ferri et Ammon. Acet. ..... ℥ vi
S.: ℥ i quaqua hora tertia.

495. Ext. Pituitary ..... gr. $^1/_{12}$
Ext. Thyroid ..... gr. ½
Ext. Adrenal ..... gr. i
Ext. Orchitic ..... gr. ii
M. f. caps. No. 1. Tal. Dos. lx.

496. Ext. Parathyroideae .....q.s.
To make 60 capsules each to contain the usual dose.

497. Apothesine, 10%, ... ℥ iv
S.: For external use.

498. Salol ..... ʒ ii
Spir. Aetheris Nitrosi..... ℥ i
Fl. Ext. Buchu..... ʒ iv
Aquae ..... ℥ iss
S.: ʒ i every 4 hours.

499. Spirosal ..... ʒ ii
Ol. Olivae ..... ℥ i
S.: For external use.

500. Sodii Thiosulph. ..... ℥ ss
Ac. Hydrochlor. ..... ʒ ii
Ess. Pepsini ..... ℥ i
Syr. Zingiberis ..... ℥ i
Aquae ..... ℥ vi
S.: ℥ ss after meals.

501. Zinci Oxidi 1.0
Camphorae 0.2
Ung. Simpl. 25.0
M. f. ung.
S.: Apply to the eyes once a day.

502. Phosphori ..... gr. 1/100
Ext. Nuc. Vom..... gr. ¼
Ferri Reducti ..... gr. ii
M. f. pil. 1. Fiant pil. lx.
S.: One, night and morning.

503. Liq. Plumbi Subacet..... ℥ ss
Ichthyolis ..... ʒ ii
Olei Olivae ..... ℥ ii
S.: For external use.

504. Phenyl Salicyl. ..... ʒ iii
Ol. Amygdal. ..... ʒ vi
Ol. Amygdal. Am. .....gtt. vi
Aquae ..... ℥ iii
S.: ʒ i 3 times a day.

505. Sulphuris Loti ..... gr. v
Potassii Bitartr. ..... gr. x
M. f. Tab. No. 1. Mitte C.
S.: One tablet 4 or 5 times a day.

506. Lupulini ..... gr. iii
Camphorae ..... gr. iv
M. f. pil. 1. Tal. Dos. xxiv.
S.: One pill at 6 p. m. and one on retiring.

507. Iodoformi ..... gr. xii
Bism. subnitr. ..... gr. xxiv
Div. in bacil. urethr. No. xii.
S.: Insert one 4 times a day.

508. Tr. Iodi ..... ʒ iv
Ac. Carbolici ..... ʒ iv
S.: Gtt. iv in water every 2 hours.

509. Potassii Brom. ..... ʒ ii
Chloral ..... ʒ i
Div. in suppos. rect. No. xii.
Insert one at night.

510. Ol. Ricini ..... ℥ ij
M. f. Emuls.
S.: ℥ ss every hour.

511. Strychn. Sulph. ..... gr. ii
Quininae Bisulph. ..... ʒ ij
Ac. Sulph. Arom. ..... ʒ i
Liq. Ferri et Ammon. Acet. ..... ℥ iv
S.: Two teaspoonsful 4 times a day.

512. Bromoformi 15.0
Aquae 150.0
M. f. Emuls. lege artis.
S.: Teaspoonful every hour until relieved, then every 3 hours.

513. Chloral
Camphor ..... āā 50.0
S.: Apply externally.

514. Chlorali Hydrati 4.0
Camphorae 2.0
Syr. Tolutani 15.0
Aquae 45.0
S.: Cochlear parvum ter in die.

515. Bism. et Ammonii Citratis 15.0
Acidi Nitrici Diluti ..... q. s.
Ess. Pepsini 25.0
Aquae 100.0
S.: Tablespoonful after meals.

516. Tr. Ferri Mur. 20.0
Spir. Amm. Arom. 15.0
Syrupi 25.0
Glycerini 25.0
Aquae 125.0
S.: Teaspoonful after meals.

517. Argenti Nitr. ..... gr. xij
Glycerini ..... ʒ i
Aquae ..... ʒ i
S.: Drop 3 drops into each eye morning and night.

518. Sol. Magendie ..... ʒ i
Ammon. Carbon. ..... ʒ ii
Syr. Ipecac ..... ʒ iv
Syr. Pruni Virg. ..... ʒ vi
Aquae, q. s. ad..... ℥ iii

519. Ac. Chromic. ..... ʒ i
Glycerini ..... ʒ iv
Aquae ..... ʒ iv
S.: Caustic. Use with caution.

520. Copaibae
Cubebae Oleores. ..... āā ʒ i
Ol. Santali ..... ʒ ii
Div. in caps. No. xii.
S.: One 3 times a day.

The following prescriptions, including the comments, were sent to me at my request by Mr. J. L. Lascoff, a well-known pharmacist of this city, whom I take this opportunity to thank for his courtesy. They are all prescriptions that were dispensed at his pharmacy.

521. Tr. Ferri Chloridi 10.0
Antipyrini 0.12
Spiritus Aetheris Nitrosi 15.0
Aquae .....ad 100.0
M. D. S. A teaspoonful every hour.

The antipyrin is added to produce a color reaction with the iron and as such is harmless; but with the addition of the sweet spirit of niter, a sharp chemical reaction takes place. At first there is a purple mixture formed with the iron and the antipyrin, then when the niter is added it turns light green, and then when allowed to stand becomes olive green, and later brown. Chemically an iso-nitroso-antipyrin is formed which is considered by many a poisonous compound. This prescription as written is incompatible. The only remedy is to use the simple spirit of ether, which was done in this case by consent of the prescriber. [As the antipyrin is added merely as a coloring agent, while the spirit of nitrous ether possesses decided therapeutic properties, it is better to leave out the former, i. e., the antipyrin, and leave in the latter—the spirit of nitrous ether.—W. J. R.]

522. Potassii Citratis 10.0
Liquoris Ammonii Acetatis
Spiritus Aetheris Nitrosi, āā..... 30.0
Tincturae Cardamomi Compositae 15.0
Aquae, q. s. ad..... 240.0
A teaspoonful every three to four hours in water.

When the above is compounded four changes of color take place as the result of chemical change. At first it is light brown, then red, then straw color, and finally becomes purple. This is all due to the presence of the niter, which contains nitrous acid.

523. Potassii iodidi 8.0
Spir. Aetheris Nitrosi 30.0
Liq. Ammon. Acetatis 60.0
Potassii Citratis 4.0
Aquae, q. s. ad..... 180.0
M. S. A teaspoonful every four hours in water.

This prescription is somewhat similar to the preceding one, but contains an additional ingredient, KI. If dispensed in the order as written, it is entirely incompatible, but a clear mixture will result if put up as follows: Dissolve the potassium citrate in sufficient water, and add the solution of ammonium acetate, followed by the nitrous ether; then dissolve the KI in the remainder of the water and mix both solutions.

524. Tincturae Benzoini Compositae 30.0
Codeinae Sulphatis 0.5
Syrupi Tolutani, ad..... 180.0
M. D. S.: Two teaspoonfuls every four hours.

By mixing the ingredients as written, the benzoin settles down along the sides and neck of the bottle. We added 8.0 gum acacia, emulsifying the benzoin; no precipitation occurs then.

525. Tinct. Iodi ..... gtt. xx
Mentholis ..... gr. viii
Alboleni ..... 1 oz.
M. D. S.: Use as a spray.

If compounded as written, a turbid mixture results, on account of the alcohol and water in the tincture of iodine, and the oil. But by using iodine crystals with a few grains of KI equivalent to tincture, we eliminate the alcohol and water, and a clear uniform mixture results.

526. Tr. Iodi
Aq. Ammon. Fort. .....āā 15.0
Lin. Saponis Camphor, q. s. ad..... 60.0
Liniment; use externally.

On mixing the above mentioned ingredients a liniment re-

sults which is first of a dark shade; it gradually gets lighter, then yellow, and finally becomes colorless. [This is of course due to the iodine combining with the ammonia, forming the colorless ammonium iodide.—W. J. R.]

527. Orthoformi 8.0
Olei Olivae 120.0
M. ft. sol.

In order to make a uniform and clear mixture, it is necessary to heat the two ingredients, as the orthoform is insoluble in the cold oil.

528. Sodii Iodidi 20.0
Elixiris Ferri, Quin., et Strychn. Phosph..... 180.0
M. D. S.: A teaspoonful three times a day after meals.

In this prescription the phosphate salts are incompatible with the sodium iodide, therefore we use the N.F.I.Q.S. which makes a clear and uniform solution. We find the same incompatibility when using bromide salts.

529. Tinct. Nucis Vomicae 8.0
Tinct. Cardamomi Comp.
Elix. Ferri Quininae et Strychninae Phosphatum 60.0
Elixiri Digestivi (N. F.)..... 60.0
S.: A teaspoonful after each meal.

In this case, one should also use the N.F. preparation of the I.Q.S., which contains the tincture of ferric citro-chloride, otherwise the mixture is turbid and not uniform. (N. B.—Elixir I.Q.S. phosphates is not official now.)

530. Brometone 0.12
Pyramidon 0.3
D. T. D. Capsulae No. 12.
Sig.: One every 3 hours until relieved.

When these two ingredients are mixed a soft mass results. To avoid this I added a small amount of Magnesium Oxide and triturated it very gently, filled in capsules and dispensed in a glass-stoppered bottle.

531. Sparteinae Sulphatis 0.05
Sacchari Lactis ..... q. s.
M. f. tabellae (*freshly prepared*) No. 12.
Sig.: One every 4 hours.

In making ordinary tablets we always use diluted alcohol; in this case we used ether and absolute alcohol, otherwise the tablets would be too soft and stick together; it would also be impossible to remove them from the mold.

532. Heroini Hydrochl. ..... gr. 1/20
Quininae Hydrochl. ..... gr. ½
Creosoti Carbonatis (Duotal) ..... min. 10
Tal. dos. soft capsules No. xxx.
Sig.: One every 4 hours.

We made a pill mass of the first two ingredients. We placed the pill in each capsule, then dropped 10 min. of the duotal in each soft capsule, sealed them properly and washed them off with pure alcohol.

533. Quininae Hydrobrom. 6.0
Camphorae Monobromatae 4.0
Ergotini 4.0
Creosoti Carbonatis 6.0
Divide into capsules No. xxx.
Sig.: One three times a day.

To the creosote carbonate I added acacia and a few drops of water, emulsified it, added the first three ingredients which were previously mixed in a separate mortar, and made a mass with the addition of 30 grains of magnesium oxide and sugar of milk. It was impossible to dispense this in soft capsules, and it was also difficult to make a mass. Without the addition of MgO the Creosote Carbonate would separate.

534. Mentholis 5.00
Phenolis 3.00
Zinci Oxidi 20.0
$MgCO_3$ 6.00
Glycerini 5.00

Olei Amygdal. Dulcis 30.00
Aquae Calcis 80.00
Aquae Rosae, q. s. ad..... 240.00
Sig.: Dab on skin every 2 hours.

This lotion is frequently prescribed by a prominent skin specialist who complained that a solid mass forms on the bottom of the bottle, the lime and rose water being separated, and not fit for use. He asked me to experiment with it, and I solved the problem by dispensing it as follows: I mixed the zinc oxide with double the amount (12.00) $MgCO_3$ in a mortar, to this I added the almond oil and lime water previously mixed, triturated this well, added the glycerin and rose water and put this mixture in the 8-oz. bottle. Then mixed the menthol with the phenol in a mortar and added it to the mixture. It formed an elegant lotion, which was perfectly white and uniform. The reason for the addition of $MgCO_3$ is to make it more alkaline. The physician accepted my suggestion.

535. Camphor ..... 2.0 grammes
Mix and make 30 pills.

We triturate the camphor with about 1 gram of powdered *soap* and add a *few drops of castor oil.* This makes a mass which does not harden. It should be dispensed in a glass container well corked. [In the author's opinion it would be simpler and altogether preferable to powder the camphor and fill it dry in 30 capsules. It is good to inform the doctor that it is much better to dispense camphor in capsule than in pill form.—W. J. R.]

536. Camphor ..... 20 grains
Menthol ..... 10 grains
Mix and make 25 pills.

Triturate the camphor and menthol. To the resulting liquid add a mixture of extract of glycyrrhiza and powdered glycyrrhiza, and then a few drops of water. This makes a

very good mass. The finished pills should be coated to prevent evaporation of the camphor.

537. Ammonium Chloride ..... 4.0 grammes
Powdered Camphor ..... 0.6 grammes
Syrup of Wild Cherry..... 30.0 grammes
Distilled water, enough to make.... 120.0 grammes

Triturate the camphor with 1 gram of granulated acacia to a fine powder and then add the syrup and water little by little.

The following prescription was sent to me for experiment by the *Druggists Circular*. (See Jan., 1919, page 21.)

538. Acetanilid ..... 3 oz.
Phenacetin ..... 2 oz.
Salol ..... 1 oz.
Caffeine ..... 1 oz.
Ac. Tart. ..... gr. ccxxx
Sod. Carbonat. ..... 3 oz.
Spt. Vin. Rect. Dil..... cong. 1

I experimented with 4 oz. I dissolved the acetanilid in 3 drams of alcohol, the phenacetin in 1 oz. of alcohol, and the salol and caffeine in 5 drams of alcohol (2 oz. of alcohol in all), and then mixed the three solutions. The tartaric acid and sodium carbonate were dissolved together in 2 ounces of water. Then the aqueous solution was gradually added to the spirituous one, when no untoward result ensued.

539. Resorcini 2.0
Sodii Boratis 5.0
Cocaini Hydrochloridi 1.0
Aquae Foeniculi 200.0
Tincturae Opii Crocatae ..... gtt. xx
Sig.: Eye lotion.

This makes a turbid mixture. If filtered, all the active ingredients will be removed. By substituting boric acid for borax a clear solution is obtained. In a similar case a leading oculist, who prescribed holocaine with borax, was glad

to accept my suggestion that boric acid be substituted for the borax. [Borax being alkaline is incompatible with alkaloids. See prescription 28.—W. J. R.]

540. Creosoti ..... c. c. 0.12
Balsam of Tolu ..... gm. 0.2
M. ft. pill, Mitte No. 50.

It is easy enough to put this prescription in capsules, but to make pills of it, the following method should be adopted: Emulsify the creosote with a little acacia, adding finely powdered balsam of tolu, with enough powdered glycyrrhiza to make a suitable mass. [A very ingenious method, indeed. And if the doctor insists on prescribing creosote in pill form, the pharmacist has no choice; but I feel in duty bound to utter my protest once more against the irrational practice of prescribing and dispensing liquids in pill form.—W. J. R.]

541. Ox Gall ..... gm. 16.0
Oil of Turpentine ..... c. c. 30.0
Glycerin ..... c. c. 120.0
Ft. sol. Sig.: Dissolve one-fourth part in a quart of water and use as an enema.

Compounded in the order in which the ingredients are named it will be impossible to produce a clear and uniform mixture; but by triturating the ox gall with a little of the glycerin and emulsifying the oil of turpentine with this, adding lastly the remainder of the glycerin, a satisfactory mixture will be effected.

542. Resorcini 0.8
Mentholis 0.8
Benzoinolis Liq. 90.0
Sig.: Use as a spray.

As resorcin is not soluble in the oil, we dissolved it in 10 or 15 drops of ether, the menthol being dissolved in the oil previously warmed. A nice clear solution was obtained.

ALPHABETICAL SUMMARY OF PRESCRIPTION INCOMPATIBILITIES

Acacia. A solution of this gum forms a thick unsightly precipitate with a solution of *lead subacetate* (but not with lead acetate), a concentrated solution of *borax, ferric salts* and *alcohol* or alcoholic tinctures. The precipitation with borax does not occur if the mixture contains a fairly large amount of syrup or glycerin; there is no precipitate with ferric salts if the mixture contains a considerable amount of free acid or if the ferric salt is well diluted with water, syrup or glycerin. With alcohol the precipitate takes place only when the percentage of the alcohol is 60 or over. It is colored blue by tincture of guaiac. Acacia often acts as a preventative of precipitation. Notably it prevents the precipitation of alkaloids by tannic acid or even potassium-mercuric iodide (Mayer's reagent).

Acetanilid. With spirit of nitrous ether it gives a yellow solution turning to red. It liquefies on being triturated with phenol, resorcin and thymol; with chloral hydrate it gives a damp powder.

Acetates. Soluble acetates give a deep red color with ferric salts, due to the formation of ferric acetate (as in Basham's mixture). With quinine salts they give a bulky pasty precipitate of quinine acetate. [Try, for instance, quinine bisulphate with sodium acetate.] Morphine acetate loses some acetic acid on exposure and becomes less soluble. Lead acetate on exposure loses some acetic acid, attracts carbon dioxide and becomes partially converted into lead carbonate.

Acetozone. Decomposed on being heated with water, or in contact with alkalies.

Acida. Acids. Practically all acids decompose carbonates and bicarbonates with effervescence and the liberation of carbon dioxide, and the formation of salts of the corresponding acid. Hydrocyanic Acid is an exception. Remember that Carbolic Acid is chemically not an acid and does not act like one.

Acidum Glycerophosphoricum is not used per se and will therefore be referred to under the head of its salts, the glycerophosphates.

Acidum Aceticum. 1. In common with other acids, it decomposes carbonates, forming an acetate and liberating CO_2. 2. With a mixture of alcohol and sulphuric acid, as in aromatic sulphuric acid, it forms acetic ether or ethyl acetate.

Acidum Arsenosum. See Arseni Trioxidum.

Acidum Benzoicum. This acid is but slightly soluble in water, but very soluble in alcohol: it is thrown out from its alcoholic solution by the addition of water. Its solubility in water is increased considerably by the presence of borax. See Benzoates.

Acidum Carbolicum. See Phenol.

Acidum Chromicum. See Chromii Trioxidum.

Acidum Gallicum. Gives bluish-black color with ferric salts, and also with ferrous (because practically we seldom meet with chemically pure ferrous salts entirely free from ferric compounds). With ammonia compounds (aromatic spirit of ammonia) it gives a variably colored mixture and precipitate. With lime water a bluish-white (or rather dirty) precipitate. With excess of sodium bicarbonate is said to give indigo blue color with blue-green precipitate. Vigorous trituration with potassium permanganate may cause an explosion with the burning up of the acid.

Acidum Picricum. Trinitrophenol. 1. Liable to explode unless carefully handled. 2. Must not be rubbed or heated

with readily oxidizable substances, as an explosion may occur. 3. Forms a precipitate with most alkaloids.

Acidum Tannicum. 1. Its most important incompatibility is with the *alkaloids,* as it precipitates practically all of them in the form of tannates. If the mixture is strongly alcoholic no precipitation may take place, as the tannates of the alkaloids are soluble in alcoholic media. *Antipyrin* being of the nature of an alkaloid, tannic acid precipitates it. 2. It precipitates some glucosides (digitalin) and some neutral principles. 3. It precipitates many of the metals, in the form of a tannate, the most important being *lead, copper, mercury* and *silver.* 4. With ammonia and potassium hydroxide and carbonate it gives a slight precipitate. 5. With *lime water* it gives a bluish-white precipitate, turning darker. 6. With *ferric salts* it gives a bluish-black or green-black solution. 7. With *ferrous* salts it is supposed to give a white precipitate, but as we practically never see ferrous salts entirely free from ferric compounds, the result is that with ferrous salts the precipitate is also dark.

8. It decolorizes a solution of iodine (unless the latter is in excess), combining with it to form various compounds. That there is a true chemical reaction between iodine and tannic acid is seen from the fact that the former does not color starch blue in the presence of the latter. 9. It is incompatible with potassium permanganate, reducing the latter. 10. With spirit of nitrous ether, there is evolution of gas, probably various oxides of nitrogen. It is supposed to be incompatible with iodoform, but the writer doubts it.

All tannin-containing drugs will of course have the same incompatibilities as tannic acid. Drugs containing a large amount of tannin are: krameria, kino, gambir, hematoxylin, quercus, rubus and wild cherry.

Aconitina. Aconitine should best be administered by itself if in solution, or in the form of pills or granules. It is not likely to be prescribed in concentrated solution, and in dilute

solution it is precipitated only by tannic acid and mercuric-potassium iodide (also gold chloride).

Aethylis Carbamas. Urethane. Produces a liquid or moist mass when triturated with antipyrin, benzoic acid, betanaphthol, camphor, hydrated chloral, exalgin, menthol, resorcin, trional, salol, salicylic acid, thymol.

Agurin. See Theobrominae Sodio-Acetas.

Alkaloids. Great care is necessary in prescribing these, because most of them being potent drugs, precipitation may cause serious consequences, by an overdose of the alkaloid being poured out in one dose. Whenever feasible, alkaloids should be prescribed by themselves, either in solution or in the form of granules, pills, etc. Alkaloids should not be prescribed with: Potassium hydroxide, carbonate and bicarbonate; sodium hydroxide, carbonate, bicarbonate and borate (also phosphate); ammonia water and ammonium carbonate; lime-water, iodides, bromides, tannic acid (or substances containing tannin); mercuric chloride; gold chloride. Besides the foregoing, quinine is also incompatible with salicylates and acetates. The reason the alkaloids are incompatible with the above enumerated substances is because the alkaloids are precipitated by them. For instance, if we prescribe morphine sulphate and ammonia water or ammonium carbonate (or the aromatic spirit of ammonia, which contains those substances), pure alkaloidal morphine, which is but very slightly soluble, will precipitate; if we prescribe morphine sulphate and tannic acid, morphine tannate will precipitate; if we prescribe strychnine sulphate and mercuric chloride, a double salt of strychnine and mercury will precipitate, etc.

It is well to bear in mind that, as a general rule, which, however, has a number of exceptions, the pure alkaloids are insoluble or very slightly soluble in water, but soluble in alcohol, in fixed oils and in oleic acid. It is just *vice versa* with alkaloidal salts.

(N. B.—The alkaloids, or their salts, official in the pharmacopeia, are: Aconitine, aethylmorphine, apomorphine,

atropine, betaeucaine, caffeine, cinchonidine, cinchonine, cocaine, codeine, colchicine, cotarnine, diacetylmorphine, emetine, homatropine, hydrastine, hydrastinine, hyoscyamine, morphine, pelletierine, physostigmine, pilocarpine, quinine, scopolamine, sparteine, strychnine, theobromine, theophylline; in practice, codeine may be prescribed with alkalies, because the pure alkaloid is itself quite soluble in water.)

Aloinum. Precipitated by tannic acid; but as aloin is almost invariably prescribed in pill or capsule form, it is hardly necessary to consider its alleged incompatibilities.

Alumen. Alumini et Potassii or Alumini et Ammonii Sulphas. 1. Alum is incompatible with the alkaline hydrates and their carbonates and lime water, aluminum hydroxide being precipitated. 2. With borax, aluminum borate (and some hydroxide) being precipitated. It has all the incompatibilities of the soluble sulphates.

Alypin. 1. This local anesthetic being in the nature of an alkaloid is precipitated by alkaline hydroxides and carbonates and by most of the alkaloidal reagents or precipitants. 2. As the alypin ordinarily used is alypin hydrochloride, it gives naturally a precipitate with silver nitrate. When it is desired to prescribe alypin with silver nitrate, alypin nitrate, which is also obtainable, should be ordered.

Amyli Nitris. Amyl Nitrite. As amyl nitrite is now dispensed exclusively by itself, in the form of glass pearls, it is useless to discuss its incompatibilities.

Antipyrina. 1. With ferric chloride either in the form of solution or tincture and other ferric salts antipyrine gives a deep-red color. (Not with the solution of ferric citrochloride, unless a mineral acid is added). 2. With calomel, particularly in the presence of moisture and of sodium bicarbonate, a small part of the calomel is converted into mercuric chloride. 3. With spirit of nitrous ether a beautiful green color is formed; if the spirit is neutral in reaction, the formation of the color is delayed and the addition of a crystal of potassium bicarbonate may delay reaction for several days.

This green compound which is iso-nitroso-antipyrine, is, contrary to prevalent belief, hardly if at all poisonous. 4. Rubbed with hydrated chloral, phenol, piperazine or sodium salicylate, a soft mass or liquid is formed.

Argenti Nitras. Silver nitrate is a delicate chemical and is easily decomposed by light and in contact with organic matter. It should always be kept in amber colored or blue bottles. It is best prescribed alone dissolved in distilled and freshly boiled water. Its principal incompatibilities are soluble chlorides, which at once precipitate silver chloride, borax (silver borate precipitating) and tannic acid (precipitate of silver tannate).

Argonin. Silver Casein. It is incompatible, a precipitate being formed, with: silver nitrate, zinc sulphate, carbolic acid, tannic acid and lead acetate.

Aristol. See Thymolis Iodidum.

Argyrol. Incompatible with zinc sulphate, lead acetate and tannic acid, a precipitate being formed.

As argyrol stains the skin and linen badly, it is well to know that the stains are quickly and completely removed by a solution of mercuric chloride.

Arseni Iodidum. Arsenic iodide should not be prescribed in solution with alkaloidal salts, as many of them are precipitated.

Arseni Trioxidum. 1. Incompatible with dialyzed iron and some other ferric salts, due to the formation of the insoluble basic ferric arsenite. 2. Incompatible with hypophosphites in acid solution and hypophosphorous acid, because reduced to metallic arsenic. 3. Said to be incompatible with strychnine salts, precipitating strychnine arsenite.

Asaprol. Calcium Beta-Naphthol Sulphonate. 1. Is decomposed by mineral acids, beta-naphthol being precipitated. 2. With solution of antipyrine a precipitate is formed.

Auri et Sodii Chloridum. Gold and sodium chloride should best be prescribed alone, and preferably in pill form. 1. It is apt to precipitate alkaloids, but such precipitation may

be prevented by the addition of a small amount of sodium thiosulphate. 2. It is incompatible with potassium iodide. 3. It is incompatible, being reduced to the metallic state, with potassium arsenite, mercurous and ferrous salts, many organic substances; also reduced by light and heat, and by metallic iron.

Benzoates. Soluble benzoates give a salmon-colored precipitate with ferric salts, due to the formation of ferric benzoate. They are incompatible, in aqueous solution, with acids, because the latter decompose them, liberating benzoic acid, the crystals of which float about in the mixture (benzoic acid being but slightly soluble in water).

Bicarbonates. 1. All bicarbonates cause an effervescence with acids, with the liberation of carbon dioxid. 2. They precipitate many alkaloids, particularly in concentrated solution. 3. When a solution of bicarbonate is heated it is converted into carbonate. This is an important point to remember, because the carbonates of potassium and sodium are much stronger and more irritant than the corresponding bicarbonates.

Bichromates (potassium) and **Chromates** form precipitates with salts of lead, silver, mercury and strontium. Potassium bichromate forms precipitates with many alkaloids. Great care should be taken in triturating bichromates with sugar, tannic acid, sulphur and other easily oxidizable substances.

Bismuthi et Ammonii Citras. Incompatible with acids, the latter decomposing the double salt, and bismuth citrate, or another basic salt of bismuth, being precipitated.

Bismuthi Subnitras. 1. With carbonates and bicarbonates in solution, carbon dioxide is liberated, due to the liberation of some nitric acid from the subnitrate. 2. Potassium iodide and other iodides convert it into the yellow to red bismuth iodide. 3. With sodium salicylate it is said to form bismuth salicylate. We have not found this to be the case. A mixture of bismuth subnitrate and sodium salicylate in water remains

unchanged for a long time. 4. With an aqueous solution of tannic acid it gradually forms the yellow tannate of bismuth. 5. The same is true of gallic acid.

Caffeina. It is well to know that the solubility of caffeine and its salts is increased by the presence of sodium salicylate, sodium benzoate and antipyrine. It is for this reason that for hypodermic and intravenous injections we generally use "double" salts of caffeine, such as caffeine-sodium salicylate.

Calcium-Betanaphthol Sulphonate. See Asaprol.

Calx Sulphurata. Sulphurated lime is incompatible with mineral acids, which decompose it, forming hydrogen sulphide, etc.

Camphora. 1. Camphor forms a liquid or soft mass when triturated with chloral, phenol, guaiacol carbonate, betol, antipyrine or thymol. 2. Water added to an alcoholic solution of camphor (spirit of camphor) throws the camphor out of solution. 3. A strong solution of a salt, such as potassium bromide, in camphor water, will throw the camphor out of solution.

Camphora Monobromata. Monobromated camphor forms a liquid or soft mass when triturated with chloral, phenol, salol or thymol.

Carbo. Charcoal is best not prescribed in mixtures containing alkaloids, glucosides or tannic acid, as it is apt to precipitate them.

Carbonates. 1. The alkaline carbonates act practically as the corresponding hydroxides in precipitating alkaloids, etc. 2. They give an effervescence with all acids (with the exception of hydrocyanic acid) with the liberation of carbon dioxide. 3. They form precipitates with soluble salts of magnesium, calcium, barium, strontium, iron, manganese, silver, aluminum, antimony, copper and zinc.

Chloralamide. See Chloralformamidum.

Chloralformamidum. Chloralamide. Forms a soft mass if rubbed with antipyrine, menthol or camphor.

Chloralum Hydratum. Hydrated Chloral. Chloral Hy-

drate. 1. When rubbed with camphor forms a thick, clear liquid: camphor-chloral. 2. Forms a liquid or soft mass when triturated with any of the following: phenol, guaiacol carbonate, quinine sulphate, trional, agurin, hedonal.

Chloretone. 1. Forms a liquid or soft mass if triturated with phenol, menthol, antipyrine (also exalgin or euphorin). 2. Said to be decomposed by alkalies and acids.

Chinosol. Oxyquinolin Sulphate. 1. An aqueous solution gives a precipitate with alkaline hydroxides and soap solution. 2. Incompatible with mercuric chloride.

Chlorates. 1. Chlorates are strong oxidizers and should not be triturated or heated with any oxidizable substance, such as the following: charcoal, sugar, sulphur, sulphides and sulphites, thiosulphates, hypophosphites, nitrites (!), reduced iron, iodine, tannic acid, gallic acid, salicylic acid, phenol, starch, lycopodium. Nor should they be triturated in the dry state with glycerin and honey; in the presence of water, however, the mixture is quite safe. 2. When hydrochloric acid is added to a chlorate, free chlorine is given off and a number of oxides of chlorine are formed.

Chromii Trioxidum. Chromic Acid. Absolutely incompatible with alcohol, ether, glycerin and other organic solvents, decomposition taking place sometimes with dangerous violence (explosion). Incompatible with hydrogen dioxide.

Citrophen. See Paraphenetidin Citrate.

Cocaina. Aside from the usual alkaloidal incompatibilities, it is well to know that an ointment of yellow mercuric oxide and cocaine hydrochloride, such as is not infrequently prescribed for inflamed eyelids, is apt to be more irritating than the ointment of the mercuric oxide alone, without the cocaine. This is due to the fact that the cocaine hydrochloride probably forms some mercuric chloride.

Codeina. 1. Codeine is precipitated by most of the alkaloidal precipitants, but *not* by the alkaline carbonates and bicarbonates. 2. It is usually stated that codeine is incompatible with some ammonium salts, such as ammonium chloride,

because ammonia is liberated. This is a purely theoretical incompatibility. Ammonium chloride and codeine have been prescribed for years, in tens of thousands of prescriptions, and may continue to be prescribed without any fear or apprehension.

Collodium. 1. Of course collodium must not be mixed with water, as the gun-cotton will at once precipitate from its alcohol-ether menstruum. 2. Ammonia water also gives a precipitate. 3. A gelatinous mass is formed with phenol and with an excess of creosote. 4. The tincture of iodine of the present pharmacopeias, i. e., one that contains potassium iodide, may be mixed with collodion without precipitation.

Creosoti Carbonas. Creosotal. Creosote carbonate is seldom prescribed with ingredients with which it is incompatible.

Creosotum. 1. Creosote gives a bluish or violet-blue color with ferric salts; the color changes to greenish and then dirty brown; usually, unless the solutions are very dilute, there is also a brown precipitate. 2. Forms a white precipitate with solution of lead subacetate. 3. If present in considerable excess forms a gelatinous mass with collodion.

Diacetylmorphinae Hydrochloridum. Heroin Hydrochloride. Heroin being an alkaloid has the usual alkaloidal incompatibilities. It is stated that both alkalies and acids readily convert it into morphine.

Diuretin. See Theobrominæ Sodio-Salicylas.

Epinephrin. Adrenalin, Suprarenalin, Suprarenin, Supracapsulin, Adnephrin. Epinephrin is one of those substances that are best prescribed alone. It gets readily decomposed and worthless in the presence of oxidizing agents. It should not be prescribed with silver nitrate, mercuric chloride, hydrogen dioxide, etc. Whenever a solution of adrenalin has acquired a brown, red, or even pink color, it has become deteriorated and should be discarded.

Exalgin. Methyl Acetanilid. Forms a soft mass when rubbed with phenol, menthol, hydrated chloral, resorcin, salicylic acid

Ferric Salts. 1. Alkaline hydroxides and carbonates cause a red-brown precipitate of ferric hydroxide. 2. Sodium borate gives a precipitate of ferric borate. 3. Alkali phosphates give a precipitate of ferric phosphate, largely or entirely prevented by the presence of sodium or potassium citrate or tartrate. 4. Potassium or sodium hypophosphite gives a precipitate of ferric hypophosphite. 5. Tannic acid gives a black color and precipitate, and this is true of all vegetable drugs which contain tannic acid. 6. Gallic acid gives a bluish black color. 7. Soluble acetates (potassium, sodium, ammonium) form a deep red color, but no precipitate, with ferric salts, due to the formation of ferric acetate. Acetic acid does not produce a red color with ferric salts. 8. Soluble benzoates give a flesh colored precipitate. 9. Salicylates give a deep violet color, and in concentration a violet precipitate of ferric salicylate. 10. Arsenites and arsenates give a precipitate of ferric arsenite and arsenate. 11. A solution of phenol, creosote or guaiacol gives a violet blue color. 12. Antipyrine gives a deep red color. So does phenacetin. Acetanilid gives a red color only in alcoholic solution. 13. Resorcin gives a dirty violet color. 14. Salol being a salicylate gives a violet color if dissolved in alcohol. So does oil of wintergreen and oil of sweet birch, both being chemically methyl salicylate. 15. A number of volatile oils, such as oils of cinnamon, cloves, pimenta, thyme, give a blue, green or brown color. 16. With mucilage of acacia ferric salts form a gelatinous mass. 17. Ferric salts, particularly ferric chloride, liberates iodine from iodides, and bromine from bromides. 18. It is well to bear in mind that syrup and glycerin prevent or retard some of the reactions enumerated above.

Ferri Phosphas (Solubilis). 1. The soluble ferric phosphate is incompatible with mineral acids which precipitate ferric phosphate (the insoluble form); the only exception is glacial phosphoric or metaphosphoric acid free from orthophosphoric acid; this does not cause a precipitate. 2. Potassium and

sodium hydroxide (but not ammonium hydroxide) cause a precipitate of ferric hydroxide.

Ferri Pyrophosphas (Solubilis). Everything said about ferric phosphate applies to ferric pyrophosphate.

Ferrous Salts. There are but two ferrous salts official, the saccharated carbonate and the sulphate; the first is always prescribed in the dry state (in the form of powders, pills or capsules) and the second almost always; so the probability of coming across any incompatibles of ferrous salts is very remote.

Ferrum. Metallic Iron. Reduced Iron. Reduced Iron must not be triturated with potassium permanganate or potassium chlorate; while the danger of an explosion is rather remote, still under certain circumstances it may occur.

Fluidextracta. Most fluid extracts being made with alcohol and containing resinous or other extractive matters give a precipitate when mixed with water.

Glucosides. Many glucosides are precipitated by tannic acid, and are as a rule decomposed by acids and alkalies.

Glycerinum. 1. Glycerin is absolutely incompatible with potassium permanganate and chromic acid. 2. With sodium borate a complex reaction occurs, glycerol borate and sodium metaborate being formed (or, as it is claimed by some, sodium glyceryl borate and glyceroboric acid), but for all that the two are not incompatible and may be safely prescribed together.

Glyceritum Boroglycerini. The boric acid is in chemical combination with the glycerin, probably in the form of glyceryl borate; on mixing it with water it is decomposed, and the liberated boric acid may precipitate out, if there is not sufficient water to hold it in solution.

Glycerophosphates. The only real incompatibility of the glycerophosphates are the mineral acids, which decompose them with the liberation of glycerophosphoric acid. The sodium glycerophosphate and the potassium glycerophosphate are very deliquescent and cannot be prescribed in powder or

capsule form. Calcium glycerophosphate is not deliquescent.

Glycyrrhizinum Ammoniatum. This is decomposed by mineral acids, glycyrrhizic acid precipitating, and the sweet taste being changed to bitter. It should therefore never be prescribed with sulphuric acid, hydrochloric acid, etc.

Guaiacolis Benzoas. Benzosol. Decomposed by alkaline hydroxides into guaiacol and a benzoate of the alkali.

Guaiacolis Carbonas. Duotal. 1. Forms a soft mass when rubbed with chloral hydrate. 2. Like other guaiacol salts it is decomposed by alkali hydroxides, being split into guaiacol and a carbonate of the alkali.

Guaiacolis Salicylas. Decomposed by alkaline hydroxides into guaiacol and a salicylate of the alkali.

Guaiacolum. The incompatibilities are practically those of creosote.

Heroin. See Diacetylmorphine.

Hexamethylenamina. Urotropin, Formin, Aminoform, Cystogen. Though this drug is prescribed in enormous amounts, still we know of no drugs with which it is incompatible. It is claimed that it is decomposed by hot water, but we are not sure even of this statement. We have been ordering it dissolved in hot water for a great many years, and the drug does not seem to be injured thereby. The only thing we want to caution the patient about is to take the hexa dissolved in or followed by a large amount of water, as otherwise it may prove irritating to the stomach.

Holocainae Hydrochloridum. Being an alkaloid, it has the incompatibilities of all alkaloids.

Homatropina. Being an alkaloid it has the incompatibilities of all alkaloids, and particularly of atropine.

Hydrargyrum Ammoniatum is decomposed by potassium, sodium or calcium hydroxide, ammonia being set free and the yellow mercuroxyammonium chloride being formed.

Hydrargyri Chloridum Corrosivum. Corrosive sublimate has many incompatibilities. 1. It might not incorrectly be stated that it is incompatible to a certain extent with water,

because an aqueous solution of it is gradually decomposed, being partly changed into calomel. Ammonium chloride prevents this change and for this reason, corrosive sublimate tablets are generally made to contain some ammonium chloride. Hydrochloric, citric or tartaric acid also prevents the change. 2. The salt with which mercuric chloride is most frequently prescribed is potassium iodide. Strictly speaking the combination is incompatible, because red mercuric iodide is formed, but this salt quickly dissolves in the excess of potassium iodide, the double salt, potassio-mercuric iodide, being formed; and from a practical, therapeutic point of view the combination is unobjectionable. 3. It is incompatible with the hypophosphites as they reduce the corrosive sublimate to calomel, and eventually to metallic mercury. 4. Incompatible with arsenites, which reduce it to calomel and then to metallic mercury. 5. It is incompatible with, because it precipitates, most alkaloidal salts. 6. It is incompatible with lime water and with potassium and sodium hydroxide which precipitate it as mercuric oxide or mercuric oxychloride. 7. Ammonia water and ammonium carbonate precipitate it as ammoniated mercury or mercuric ammonium chloride. 8. Potassium carbonate or sodium carbonate gives a precipitate, consisting of a mixture of mercuric oxychloride and mercuric oxide. 9. Potassium bicarbonate or sodium bicarbonate also gives a precipitate, first white, then turning to red, of various oxychlorides of mercury, with a slight effervescence. 10. It is incompatible with borax which precipitates it as mercuric oxychloride, of a reddish brown color.

Hydrargyri Chloridum Mite. 1. As calomel and iodoform are frequently prescribed together, it is well to know that a chemical combination takes place between the two, particularly in the presence of moisture, some red mercuric iodide being formed. This is also true of other compounds containing iodine, such as aristol, airol and europhen. 2. Calomel should not be prescribed with cocaine or cocaine hydrochloride in eye salves, as a small amount of mercuric chloride is formed which

may prove irritating to the eye. 3. The incompatibility of calomel with sodium bicarbonate is a myth, and the physician need have no hesitation in prescribing, nor the pharmacist in dispensing, this combination. 4. It is incompatible with the hydroxides of potassium sodium, potassium and calcium which convert it into the black mercurous oxide ("Black Wash"). 5. Sodium and potassium carbonates convert it into mercurous oxide and carbonate. 6. Ammonia water and ammonium carbonate convert it into black mercurous ammonium chloride. 7. Soluble iodides (as well as soluble bromides) convert calomel, in the presence of moisture, into mercurous iodide (or bromide), which is apt to become further decomposed into mercuric iodide (or bromide) and metallic mercury. 8. Contrary to the prevalent belief calomel is not incompatible with sodium chloride or hydrochloric acid. 9. It is not advisable to prescribe iodine and calomel in the same ointment, as mercuric iodide may form, which is very irritating.

Hydrargyri Iodidum Flavum. Mercurous iodide is incompatible with iodides, becoming decomposed into the more toxic mercuric iodide and metallic mercury.

Hydrargyri Iodidum Rubrum. The red mercuric iodide which is only slightly soluble in water is very soluble in the presence of a soluble iodide with which it forms a double salt. It is therefore often prescribed in combination with potassium iodide.

Hydrargyri Salicylas. This practically insoluble salt dissolves in a solution of sodium chloride, also in a solution of the chlorides, iodides and bromides of the other alkalies. And a solution of it in physiologic salt solution is used for hypodermic injections.

Hyoscyamina. The alkaloid hyoscyamine, contrary to other alkaloids, is not precipitated by potassium or sodium bicarbonate; you need therefore have no hesitation in prescribing fluidextract of hyoscyamus in combination with potassium bicarbonate, as is so often done in cystitis and in acute gonorrhea.

Ichthyol. 1. Ichthyol is chemically ammonium sulphichthyolate, and is decomposed by acids, the sulphichthyolic or ichthyolsulphonic acid precipitating in the form of a sticky mass. 2. It gives a precipitate with potassium iodide, potassium bromide, zinc sulphate, and alum. These are really the only incompatibilities of any practical importance. The other so called incompatibilities are only such in theory and need not be taken into account.

Iodoformum. 1. Iodoform mixed with calomel *may* under certain circumstances (exposure to light) enter into chemical action and form some mercuric iodide. 2. It is perhaps slowly decomposed and also deodorized by tannic acid. 3. It is *not* incompatible with Balsam of Peru, statements to the contrary notwithstanding.

Iodum. Iodine is prescribed practically in two forms only: that of the tincture and that of the ointment. The tincture of the present pharmacopeia contains potassium iodide and is therefore readily miscible with water, which was not the case with the tincture of iodine of the old pharmacopeias. The tincture has few incompatibilities. 1. It is best to be careful about mixing it with ammonia water, as there is a possibility —a slight one—of "iodide of nitrogen" being formed, which when in the dry state is highly explosive. 2. With metallic mercury iodine combines to form first mercurous and then mercuric iodide. This is a point of practical importance, because doctors often prescribe ung. iodi and ung. hydrargyri in the same prescription, and such an ointment sometimes proves highly irritating and burning, due to the formation of mercuric iodide. 3. Iodine when added to oil of turpentine occasionally causes a violent reaction. 4. Tincture of iodine or Lugol's solution precipitates most alkaloids.

Lactophenin. Phenetidin Lactate. Incompatible with, because decomposed by, acids and alkalies.

Liquor Arseni et Hydrargyri Iodidi. Donovan's Solution. This double iodide solution precipitates nearly all alkaloids.

Liquor Calcis. Lime water. Absorbs carbon dioxide from

the air, forming calcium carbonate which precipitates. Should therefore not be exposed to the air. Incompatible with numerous substances, discussed under their proper headings.

Liquor Formaldehydi. 1. Formaldehyde is incompatible with hydrogen dioxide which oxidizes it to formic acid. Iodine is claimed to do the same thing. 2. It is incompatible with potassium permanganate, and we take advantage of this incompatibility in disinfecting rooms by the formaldehyde-permanganate method. 3. With ammonia formaldehyde combines to form hexamethylenamine. It is for this reason that ammonia water is an efficient antidote in poisoning with formaldehyde.

Liquor Hydrogenii Dioxidi. While hydrogen dioxide is a strong oxidizing agent, it is so seldom prescribed in combination, that its importance as an incompatible factor is not very great. Many of the statements made regarding it are not true. So it is usually stated that hydrogen dioxide converts calomel into mercuric chloride; this is not so; the calomel undergoes no change. A few points are important to bear in mind. 1. It is absolutely incompatible with potassium permanganate. 2. It is incompatible with carbolic acid. 3. Incompatible with formaldehyde. 4. Its incompatibility with glycerin is mythical. The two may very well be prescribed together.

Liquor Plumbi Subacetatis. 1. With mucilage of acacia it forms a thick gelatinous mass,—if concentrated; if diluted, stringy pieces are formed. Lead acetate does not form a precipitate with mucilage of acacia. 2. Forms a precipitate with a strong solution of phenol.

Liquor Potassii Arsenitis. Besides the incompatibilities of arsenites, Fowler's solution is incompatible with alkaloids, because it contains some potassium bicarbonate (and carbonate).

Lithium Salts. The only incompatibilities of practical importance of the lithium salts are potassium, sodium and ammonium carbonate and phosphate. They give a precipitate of lithium carbonate and lithium phosphate.

Magnesium Salts. The soluble magnesium salts, particularly in concentrated solution, are precipitated by the alkaline hydroxides (as magnesium hydroxide); by the alkaline carbonates (as basic magnesium carbonate) and by alkaline phosphates (as magnesium phosphate).

Mel. Honey is supposed to decompose borax with the liberation of boric acid, but this is no incompatibility, but an advantage, and while the well-known, old time preparation of *mel boracis*—honey with borax—is becoming obsolete, there is no harm in it, and there should of course be no hesitation in dispensing it.

Menthol. 1. When menthol is triturated with camphor, thymol, hydrated chloral or resorcin, the mixture becomes liquid. 2. When water is added to an alcoholic solution of menthol, the menthol separates out in the form of oily drops.

Methylis Salicylas. Methyl salicylate, or oil of sweet birch or artificial oil of wintergreen, gives a deep violet color with ferric salts.

Morphina. 1. Besides the general incompatibilities of alkaloids, morphine gives a blue, changing to dirty green, color with ferric chloride in neutral aqueous solution. Acid or alcohol prevents this color reaction. 2. It gives a yellowish color with spirit of nitrous ether. 3. It is claimed to be oxidized by chlorates.

Novocaine. Novocaine being an alkaloid, its salts are precipitated, like other alkaloidal salts, by alkaline hydroxides, carbonates, etc.

Olea Fixa. Fixed or Fatty Oils. 1. The usual error of the inexperienced druggist is that fixed oils are readily soluble in or miscible with glycerin. They are not. Nor are they soluble in alcohol, the only exceptions being castor oil and croton oil. 2. With alkaline hydroxides fixed oils combine and form soaps or emulsion-like mixtures. This is taken advantage of in a number of pharmaceutical preparations.

Olea Volatilia. Volatile or Essential Oils. Volatile oils are soluble in alcohol and only to a slight extent in water. When

water is added to an alcoholic solution of a volatile oil, the latter therefore separates out and a turbidity or milkiness is produced.—Oil of cloves gives a green color with tincture of ferric chloride. Oil of cinnamon gives a brown color.

Opium. 1. On account of the morphine and the meconic acid which it contains, tincture of opium gives a red color with solution of ferric chloride. With tincture of iron the reaction is not pronounced. 2. Tincture of opium contains numerous alkaloids which are thrown out of solution by most of the alkaloidal precipitants. 3. The well known lead and opium wash—Lotio Plumbi et Opii—is an incompatible combination. Nevertheless it will continue to be prescribed, because physicians claim good results from it in various inflammatory conditions, in bruises and in sprains.

Oxidizing Agents. In studying incompatibilities, we often come across the term "oxidizing agents." Oxidizing agents are chemicals that more or less readily give up their excess of oxygen to substances which readily combine with that oxygen, in other words, are readily oxidized. The most important oxidizing substances from a practical point of view are chlorates, permanganates, nitrates (chromates), also chromic, nitric and nitrohydrochloric acids. These chemicals should not be mixed, or only very carefully, with sulphur, charcoal, hypophosphites, tannic acid, glycerin, honey, starch, sugar and vegetable powders in general.

Pancreatinum. Pancreatin in aqueous solution is precipitated by strong alcohol and mineral acids, and its value is diminished—so it is generally held—by contact with those substances, as well as in the presence of pepsin.

Paraldehydum. It is claimed that paraldehyde is incompatible with iodides, because it decomposes them with the liberation of iodine.

Paraphenetidin Citrate. Citrophen. Gives a red color with ferric salts.

Piperazina. 1. All that it is really necessary to remember about piperazine is that it is strongly alkaline and that it

should therefore not be prescribed with alkaloids, as it would cause their precipitation. 2. As piperazine is hygroscopic it should not be prescribed in powder form. 3. Particularly with acetanilid or antipyrine it is apt to form a liquid or soft mass.

Pepsinum. Pepsin is considered incompatible with alkalies, alcohol, and hydrochloric acid of a higher concentration than 0.5 per cent. All those substances on prolonged contact are supposed to destroy its digestive activity.

Peroxida. Peroxides are incompatible with acids which decompose them with the liberation of hydrogen peroxide. When dissolved in water, the same reaction takes place, only more slowly.

Petrolatum. 1. Petrolatum, liquid or solid, is *not* miscible with glycerin, water or alcohol; with the solid petrolatum small quantities of those liquids can be incorporated. 2. In incorporating alkaloids with petrolatum it is best to use the free alkaloids instead of the alkaloidal salts, because the former are slightly soluble in petrolatum, but not the latter.

Phenocoll Hydrochloride. Phenocoll is alkaloidal in its character and has the general incompatibilities of the alkaloids.

Phenol. Carbolic Acid. Phenylic Acid. 1. Incompatible with collodion, forming a gelatinous mass. 2. Incompatible with hydrogen dioxide, becoming oxidized to pyrocatechin, hydroquinone, etc. 3. Incompatible with potassium permanganate, becoming oxidized to oxalic acid and carbon dioxide. 4. Incompatible with nitric acid, becoming converted into picric acid. 5. It reduces silver salts. 6. In dilute solution (1 per cent.) it gives a violet blue color with ferric salts. 7. Phenol forms a liquid or a soft mass when triturated with the following substances: acetanilid, antipyrin, betanaphthol, camphor, monobromated camphor, hydrated chloral, menthol, naphthalene, pyrogallol, resorcin, salol and thymol.

Remember that carbolic "acid" is not an acid, and will not for instance liberate CO_2 from a carbonate or a bicarbonate.

Phenylis Salicylas. Being a salicylate it has the incompat-

ibilities of the latter; but it generally needs first to be dissolved in an alcoholic menstruum, before it develops its reaction. It forms a liquid or soft mass when triturated with antipyrin (damp powder), camphor, monobromated camphor, chloral hydrate, exalgin, naphthalene, phenol, thymol and urethane.

Plumbi Acetas. 1. Incompatible with potassium and sodium hydroxide (lead hydroxide), potassium and sodium carbonate (lead carbonate), borax (lead borate). 2. Incompatible with H_2SO_4 or soluble sulphates, with HCl or soluble chlorides, with soluble iodides, bromides and phosphates. 3. With tannic acid and pyrogallol. 4. With soluble benzoates and salicylates. 5. With many alkaloids. 6. Both on account of chemical reaction and the liberation of water of crystallization it forms a soft mass when rubbed with alum, zinc sulphate, phenol, acetanilid or salicylic acid.

Potassii Permanganas. Potassium permanganate belongs to those few substances in medicine which should always be prescribed alone, if ordered in aqueous solution. It is very easily acted upon by a large number of chemicals, and practically by all organic substances, and it is particularly the latter that must be avoided. 1. It is incompatible with hydrogen dioxide, a very complex reaction taking place, with the result that both the permanganate and the dioxide are destroyed. 2. It is absolutely incompatible with glycerin, alcohol and carbolic acid. 3. It should never be triturated, as an explosion may result, with sulphur, charcoal, sugar, tannic acid, picric acid or other organic substances.

Potassii et Sodii Tartras. Rochelle Salt. Practically all acids decompose it, combining with the sodium radical and potassium bitartrate (cream of tartar) precipitating.

Protargol. 1. Protargol in solution is precipitated by zinc sulphate, lead acetate, mercuric chloride, alum, and silver nitrate. 2. It is best never to prescribe it with alkaloids, as a precipitate is apt to occur. 3. The addition of glycerin to protargol is reprehensible, as a protargol solution containing glycerin is more irritating than a pure aqueous solution. 4.

Being an organic compound, protargol is incompatible with potassium permanganate.

Pyramidon. 1. Gives a blue and violet color with spirit of nitrous ether. 2. With a solution of quinine bisulphate it gives a white precipitate. 3. If triturated with hydrated chloral it forms a soft mass.

Pyrogallol. 1. Gives a purple color with lime water, which changes to dirty brown. 2. Gives a white precipitate gradually turning dark with lead acetate. 3. Absolutely incompatible with potassium permanganate. 4. It forms a liquid or soft mass when triturated with antipyrine, camphor, phenol or menthol.

Quinina. 1. Solutions of quinine salts are incompatible with, because precipitated by, soluble acetates, benzoates, salicylates, and tartrates. The corresponding acids do not cause a precipitate. 2. A precipitate is also said to be given by resorcin. 3. Triturated with thymol quinine sulphate produces a soft mass. 4. Of course solutions of quinine and its salts have all the general incompatibilities of alkaloids.

Resorcinol. 1. Resorcin either in substance or in solution turns reddish, then dark when exposed to air and light. 2. It precipitates a solution of quinine sulphate or bisulphate. 3. When triturated with acetanilid, antipyrine, camphor, camphor monobromide, phenol or menthol it forms a liquid or soft mass.

Salol. See Phenylis Salicylas.

Saloquinine. This chemical is insoluble in water but soluble in acids, from which acid solution it is precipitated by alkaline hydroxides and carbonates and the other general alkaloidal precipitants.

Santonin. Santonin is practically insoluble in water, but is soluble in the presence of alkalies, combining with the latter to form a santoninate. It turns yellow on exposure to light. An aqueous solution of sodium santoninate or any other santoninate is precipitated by tannic acid.

Sapo. Soap is generally alkaline and when prescribed, as

it occasionally is, with calomel, it converts the latter into the black mercurous oxide. Soap is decomposed by mineral acids, the fatty acids being liberated. Metallic salts generally decompose a solution of soap, the metallic oleate precipitating.

Sodii Boras. Borax is alkaline in reaction and therefore tends to precipitate the alkaloids. Glycerin however by decomposing the borax (into boric acid and sodium borate) prevents this precipitation. As just stated, glycerin and borax react upon one another, but this cannot be considered an incompatibility.

It is incompatible with mucilage of acacia, producing a thick gelatinous mass. Syrup prevents this precipitation. Triturated with alum it forms a moist powder (due to the liberation of the large amount of water of crystallization).

Sodii Perboras. When sodium perborate is dissolved in water hydrogen dioxide and sodium metaborate are formed.

Sodii Phosphas. Being slightly alkaline it has a tendency to precipitate some alkaloids. When triturated with antipyrin or sodium salicylate, the powder becomes damp. It, of course, has the incompatibilities of the phosphates.

Sodii Thiosulphas. (Sodium Hyposulphite). Incompatible with all acids, sulphur dioxide being evolved and sulphur precipitating. It should not be triturated with chlorates, chromates, nitrates and permanganates, and other oxidizing substances, as an explosion is liable to take place. It is absolutely incompatible with silver and mercury salts, reducing them to the metallic state or to sulphides. It reduces ferric salts to ferrous compounds.

Spiritus Aetheris Nitrosi. Spirit of Nitrous Ether. Sweet Spirit of Niter. This is an important substance on account of its many incompatibilities and frequency of prescribing. 1. It is incompatible with antipyrin, producing iso-nitroso antipyrin of a grass-green color. Though this compound is not poisonous, as it was once considered, still it is better not to dispense antipyrin with spirit of nitrous ether. 2. With acetanilid it gives a yellow solution. 3. It is incompatible with bromides

and particularly iodides, liberating bromine and iodine. 4. With sodium salicylate the mixture acquires a dark color. 5. With tannic acid and substances containing tannic acid, such as buchu, uva ursi, there is quite an evolution of gas (various oxides of nitrogen) and the bottle should not be stoppered until all the gas has escaped. These reactions take place principally with a spirit having an acid reaction, but it is very rare indeed to find a spirit of a perfectly neutral reaction.

Spiritus Ammoniae Aromaticus. When mixed with water or aqueous menstrua turbidity results, due to the separation of the oils. It has all the incompatibilities of ammonia water and ammonium carbonate.

Spiritus Glycerylis Nitratis. Nitroglycerin is so seldom prescribed with other drugs that there is no occasion to consider its incompatibilities. In fact it always should be prescribed alone, not only for pharmaceutical or chemical, but for therapeutic reasons.

Strontium. Strontium salts are precipitated by alkaline hydroxides and carbonates, soluble phosphates, sulphates, (chromates), and citrates.

Strychnina. See Alkaloids. Hydrochloric acid with a solution of strychnine hydrochloride is said to give a precipitate. But this can only refer to the strong hydrochloric acid, and such a combination is not likely ever to be met with in practice.

Sulphonethylmethanum. Trional. This hypnotic is not likely to be prescribed with substances with which it forms incompatible combinations. One might remember that if triturated with hydrated chloral or urethane a soft mass will result.

Sulphonmethanum. Sulphonal. This is a very stable substance and we know of no incompatibilities. It is claimed to liquefy when triturated with hydrated chloral.

Sulphur. The only thing in incompatibilities to remember about sulphur is not to triturate it with a strong oxidizer, such as potassium permanganate or potassium chlorate. An explosion may occur.

Theobrominae Sodio-Acetas. Agurin. 1. Incompatible with acids, which split up the salt. 2. Being alkaline it is apt to precipitate some of the alkaloids from the solutions of their salts.

Theobrominae Sodio-Salicylas. Diuretin. 1. Absolutely incompatible with acids which split up the salt. 2. Being alkaline it is apt to precipitate some of the alkaloids. 3. Being a salicylate it has the incompatibilities of a salicylate.

Thymol. When rubbed with acetanilid, antipyrin, camphor, monobromated camphor, carbolic acid, hydrated chloral, menthol, salol, or quinine sulphate, thymol forms a liquid or a soft mass.

Thymolis Iodidum. Aristol. 1. It is not advisable to triturate it strongly with calomel, as the liberated iodine may convert a portion of the calomel into mercuric iodide. 2. Contrary to careless statements, it is quite compatible with starch.

Tinctura Iodi. The old pharmacopeial tincture would give a precipitate when mixed with water or aqueous preparations. The tincture of the new pharmacopeia, however, containing as it does potassium iodide, is perfectly miscible with aqueous menstrua. Of course the tincture has the incompatibilities of iodine and potassium iodide (q. v.), modified by the alcohol.

Trinitrophenol. See Acidum Picricum.

Trional. See Sulphonethylmethanum.

Urea. It is not likely that urea will be prescribed in combination with other substances, but we might mention that when triturated with hydrated chloral it produces a soft mass or a liquid.

Zinc Salts. Soluble zinc salts are incompatible with soluble hydroxides, carbonates, phosphates, and with borax. With tannic acid zinc salts give a precipitate only in concentrated solution.

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